# ATLANTIC JOURNAL,

AND

# FRIEND OF KNOWLEDGE;

A CYCLOPEDIC JOURNAL AND REVIEW

OF UNIVERSAL SCIENCE AND KNOWLEDGE:—HISTORICAL, NATURAL, AND MEDICAL ARTS AND SCIENCES:—INDUSTRY, AGRICULTURE, EDUCATION AND EVERY KIND OF USEFUL INFORMATION:

*WITH NUMEROUS FIGURES.*

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*Knowledge is the mental food of man.*


1. ARTICLE.

## CHEAP BOOKS.

BOOKS are the vehicles of knowledge. The cheaper books are, the more accessible and diffusible becomes the knowledge which they convey.

Before printing was invented, manuscripts were few and costly, knowledge scanty and limited. Since printed books have become common, knowledge has increased 100 fold, libraries have multiplied, and mankind have acquired new means of enjoyment, of happiness, and mental attainments.

But books which had been rather cheap 100 years ago, had within 50 years become again very dear, owing to a fanciful luxury in paper, embellishments, and splendid bindings. This was one of the means, partly contrived by the oligarchy of knowledge, to exclude the people or bulk of mankind from the acquirement of knowledge.

Happily however since the beginning of this century, by the enlightened enterprize of some friends of mankind and the invention of stereotype printing, both arisen in France, a new era has begun in printing and producing again very cheap books; without precluding embellishments: which the restoration of wood engraving and the invention of lithography, have enabled to add at a cheap rate.

This new system, which promises such happy results for the gradual and universal spreading of knowledge, has lately been adopted also in Germany, England and America. But unfortunately chiefly applied (as at the discovery of printing) to restore or reprint old books, rather than producing new works. But some useful compilations, libraries of knowledge, manuals, &c. have been produced accessible to all the classes of the people.

It is a positive fact that in general mental acquirements and public happiness, are now every where in proportion to the average price of books, and the facility, or cheapness of this manufacture of knowledge! of this fact the following table may be a proof.

| Average price of books in retail. | Vol. 8vo. of 400 pages. | Vol. 18mo. of 200 p. |
|---|---|---|
| Before printing was invented, towards 1400, | $100.00 | $25.00 |
| Towards 1700, | 1.00 | 0.25 |
| Towards 1800, in England, | 5.00 | 1.00 |
| in France, | 1.50 | 0.50 |
| in 1830. | | |
| In England, | 3.00 | 0.75 |
| In the U. States, | 2.00 | 0.50 |
| In Germany, | 1.25 | 0.25 |
| In France, | 1.00 | 0.20 |

Therefore in France where books are the cheapest, the people are the most enlightened, and they stand at the head of the actual civilization of polished nations.

But why could not the same prices and results be attainable with us? A great fall in the price of printing and paper has happened within

15 years, all the prices have fallen from 25 to 50 per cent, even for Stereotyping.—Engraving alone in all its branches is yet too costly, wood engraving more so than even in England, for lack of engravers. We advise 100 of the wood engravers of England, who work at two shillings a day to come here. Notwithstanding, some useful and cheap works ornamented with wood engravings have been published, such are Professor Nuttall's Birds, and Professor Rafinesque's Medical Flora.

The high duties and taxes on paper are also another evil; notwithstanding the fall in prices, paper could be imported for our periodical press and books from Germany, France and Italy at one half the actual cost, if our duties were not prohibitory and a shameful tax on knowledge.

Our publishers who have capital, employ it chiefly in reprinting English books, to avoid paying copyrights. They steal English knowledge, and cramp with it American genius. When these impediments will be removed we can print here as cheap as in France, and send the productions of our press all over the world, as the French now do theirs: besides improving ourselves.

BENJ. FRANKLIN, junr.

## 2. PHILOLOGY.

*Second Letter to Mr.* CHAMPOLLION *on the Graphic Systems of America, and the Glyphs of* OTOLUM *or* PALENQUE, *in Central America.*—ELEMENTS OF THE GLYPHS.

I have the pleasure to present you hereto annexed, a tabular and comparitive view of the Atlantic alphabets of the 2 Continents, with a specimen of the Groups of Letters or Glyphs of the monuments of Otolum or Palenque: which belong to my 7th series of graphic signs, and are in fact words formed by grouped letters or Elements as in Chinese Characters; or somewhat like the cyphers now yet in use among us, formed by acrostical anagrams or combinations of the first letters of words or names.

When I began my investigation of these American Glyphs, and became convinced that they must have been groups of letters, I sought for the Elementary Letters in all the ancient known alphabets, the Chinese Sanscrit and Egyptian above all; but in vain. The Chinese characters offered but few similarities with these glyphs, and not having a literal but syllabic alphabet, could not promise the needful clue. The Sanscrit alphabet and all its derived branches, including even the Hebrew, Phenician. Pelagic, Celtic and Cantabrian alphabets were totally unlike in forms and combinations of grouping. But in the great variety of Egyptians form of the same letters, I thought that I could trace some resemblance with our American Glyphs. In fact I could see in them the Egyptian Cross, Snake, Circle, Delta, Square, Trident, Eye, Feather, Fish, Hand, &c. but sought in vain for the Birds, Lions, Sphynx, Beetle, and 100 other nameless signs of Egypt.

However, this first examination and approximation of analogy in Egypt and Africa was a great preliminary step in the enquiry. I had always believed that the Atlantes of Africa have partly colonized America, as so many ancient writers have affirmed; this belief led me to search for any preserved fragments of the alphabets of Western Africa, and Lybia, the land of the African Atlantes yet existing under the names of Berbers, Tuarics, Shelluhs &c. This was no easy task, the Atlantic antiquities are still more obscure than the Egyptian. No Champollion had raised their veil; the city of Farawan, the Thebes of the Atlantes, whose splendid ruins exist as yet in the Mountains of Atlas, has not even been described properly as yet, nor its inscriptions delineated.

However I found at last in Gramay (Africa Illustrata) an old Lybian alphabet, which has been copied by Purchas in his collection of old alphabets. I was delighted to find it so explicit, so well connected

with the Egyptian, being also an Acrostic Alphabet, and above all to find that all its signs were to be seen in the Glyphs of Otolum. Soon after appeared in a supplement to Claperton and Denham's travels in Africa, another old and obsolete Lybian alphabet, not acrostical, found by Denham in old inscriptions among the Tuarics of Targih and Ghraat west of Fezan: which although unlike the first had yet many analogies, and also with the American glyphs.

Thinking then that I had found the primitive elements of these glyphs, I hastened to communicate this important fact to Mr. Duponceau (in a printed letter directed to him in 1828) who was struck with the analogy, and was ready to confess that the glyphs of Palenque, might be alphabetical words; although he did not believe before that any American alphabets were extant. But he could not pursue my connection of ideas, analogies of signs, languages and traditions, to the extent which I desired and now am able to prove.

To render my conclusions perspicuous, I must divide the subject into several parts: directing my enquiries 1st. on the old Lybian alphabet. 2dly. On the Tuaric alphabet. 3dly. On their elements in the American glyphs. 4thly. On the possibility to read them. While the examination of their language in connection with the other Atlantic languages, will be the theme of my third letter.

I. The old Lybian delineated in the Table No. 1, has all the appearance of a very ancient alphabet, based upon the acrostical plan of Egypt; but in a very different language, of which we have 16 words preserved. This language may have been that of a branch of Atlantes, perhaps the Getulians (GE-TULA, or Tulas of the plains) or of the Ammonians, Old Lybians, and also Atlantes.

Out of these 16 words, only 5 have a slight affinity with the Egyptian, they are

| | | |
|---|---|---|
| Nose | Ifr. L. | Nif. E. |
| Sea | Mah | Mauh. |
| Saturn | Siash | Sev. |
| Venus | Uaf | Ath. |
| Ear | Aips | Ap. |

While this Lybian has a greater analogy with the Pelagic dialects, as many as 12 out of 16 being consimilar.

| | | |
|---|---|---|
| Eye | Esh L. | Eshas P. |
| Nose | Ifr | Rinif. |
| Hand | Vuld | Hul, Chil. |
| Earth | Lambd | Landa. |
| Sea | Mah | Marah. |
| Fire | Rash | Purah. |
| Moon | Cek | Selka, Kres. |
| Mars | Dor | Hares, Thor. |
| Mercury | Goreg | Mergor. |
| Venus | Uaf | Uenas. |
| Saturn | Siash | Satur, Shiva. |
| Jupiter | Theue | Theos. |

Therefore the numerical analogy is only 32 per cent with the Egyptian, while it is 75 per cent. with the Pelagic. Another proof among many that the ancient Atlantes were intimately connected with the Pelagian nations of Greece, Italy, and Spain; but much less so with the Egyptians from whom they however borrowed perhaps their graphic system.

This system is very remarkable. 1. By its acrostic form. 2 By having only 16 letters like most of the primitive alphabets, but unlike the Egyptian and Sanscrit. 3. By being susceptible of 22 sounds by modification of 6 of the letters, as usual among the Pelagian and Etruscan. 6. Above all by being based upon the acrostics of 3 important series of physical objects, the 5 senses represented by their agents in man, the 4 elements of nature and the 7 planets: which are very philosophical ideas, and must have originated in a civilized nation and learned priesthood. 5. By the graphic signs being also rude delineations of these

physical objects or their emblems. The ear, eye, nose, tongue and hand for the 5 senses. The triangle for the earth, fish for the sea or water, snake for the air, flame for fire. A circle for the sun, crescent for the moon, a sword for Mars, a purse for Mercury, the V for Venus, double ring for Saturn, and trident for Jupiter. Venus being the 5th planet has nearly the same sign as U the 5th letter.

These physical emblems are so natural and obvious, that they are sometimes found among many of the ancient alphabets; the sun and moon even among the Chinese. But in the Egyptian alphabets, the emblems apply very often to different letters, owing to the difference of language and acrostic feature. Thus the hand applies to D in Egyptian instead of U, the eye to R, the circle to O, the snake to L, &c.

II. The second Lybian alphabet No. 2, in the Tables, was the ancient alphabet of Tuarics, a modern branch of the Atlantes, until superseded by the Arabic. Denham found with some difficulty its import, and names of letters which are not acrostic but literal, and 18 in number. It is doubtful whether these names were well applied in all instances, as the explainer was ignorant and Denham not aware of the importance of this alphabet. Some appear not well named and U with V have the same sign W; but these are always interchangeable in old language, and in alphabet No. 1 V is called UAF instead of VAF, and U is VULD instead of UULD!

As we have it, this alphabet is sufficiently and obviously derived from the First, 11 out of the 16 letters being similar or nearly so, while only 5 are different, E, M, R, G and Z. This last appears the substitute of TH, of No. 1, and GH represents G. Yet they are by far more alike than the Demotic is from the Hieratic Egyptian, and I therefore deem this No. 2 a Demotic form of the ancient Lybian or Atlantic.

I might have given and compared several other Lybian alphabets found in inscriptions; but as they have been delineated without a key nor names, it is at present very difficult to decypher them. I however recommend them to the attention of the learned, and among others, point out the Lybian inscription of Apollonia, the harbour of Cyrene, given by Lacella in his travels in the Cyrenaica. The letters of this inscription appear more numerous than 16 or even 22, and although they have some analogies with the 2 Lybian alphabets, yet approximate still more to the Demotic of Egypt and the Phenician, But the inscriptions in Mount Atlas and at Farawan, when collected and decyphered, will be found of much greater historical importance.

III. Meantime in the column No. 3 of the tabular view are given 46 Elements of the Glyphs of Otolum or Palenque, a few of these glyphs being given also in column No. 4. These 46 elements are altogether similar or derived from the Lybian prototypes of No. 1 and 2. In some cases they are absolutely identic, and the conviction of their common origin is almost complete, particularly when taken in connection with the collateral proofs of traditions and languages. These elements are somewhat involved in the grouping, yet they may easily be perceived and separated. Sometimes they are ornamented by double lines or otherwise, as monumental letters often are. Sometimes united to outside numbers represented by long ellipses meaning 10 and round dots meaning unities, which approximates to the Mexican system of graphic numeration. Besides these 46 elements, some others may be seen in the glyphs, which I left off, because too intricate; although they appear reducible if a larger table could have been given. There is hardly a single one that may not be traced to these forms, or that baffles the actual theory. Therefore the conclusion must occur, that such astonishing coincidence cannot

be casual, but it is the result of original derivation.

The following remarks are of some importance.

1. The glyphs of Otolum are written from top to bottom, like the Chinese, or from side to side indifferently like the Egyptian and the Demotic Lybian of No. 2. We are not told how No. 1 was written, but probably in the same way. Several signs were used for the same letter as in Egypt.

2. Although the most common way of writing the groups is in rows and each group separated, yet we find some framed as it were in oblong squares or tablets like those of Egypt. See plate 12 of the work on Palenque by Delrio and Cabrera. In that 12th plate there are also some singular groups resembling our musical notes; could they be emblems of songs or hymns?

3. The letter represented by a head occurs frequently; but it is remarkable that the features are very different from those of the remarkable race of men or heroes delineated in the sculptures.

4. In reducing these elements to the alphabetical form, I have been guided by the mere plausible theory evolved by similar forms. We have not here the more certain demonstration of Bilingual inscriptions; but if languages should uphold this theory, the certainty will be increased of the Atlantic origins of Otolum.

IV. But shall we be able to read these glyphs and inscriptions? without positively knowing in what language they were written! The attempt will be arduous, but is not impossible. In Egypt, the Coptic has been found such a close dialect of the Egyptian, that it has enabled you to read the oldest hieroglyphs. We find among the ancient dialects of Chiapa, Yucatan and Guatimala, the branches of the ancient speech of Otolum. Nay, Otolum was perhaps the ancient TOL or TOLA, seat of the Toltecas (people of Tol) and their empire; but this subject will belong to my third letter. I will now merely give a few attempts to read some of the groups. For instance.

1. The group or word on the seat of the sitting man of plate 4 of monuments of Palenque, I read UOBAC being formed by a hand, a tongue, a circle, an ear and a crescent. It is perhaps his name. And underneath the seat is an eye with a small circle inside meaning EB.

2. In plate 5, is an eye with 2 annexed rings, meaning probably BAB, and perhaps the Sun, which is BAP in the Lybian alphabet.

3. In plate 7, the glyph of the corner with a head, a fish and a crescent means probably KIM.

4. The 1st glyph of plate 15, is probably BALKE.

5. I can make out many others, reading ICBE, BOCOGO, POPO, EPL, PKE, &c.

If these words and others (although some may be names) can be found in African languages, or in those of Central America, we shall obtain perhaps the key to the whole language of Old Otolum. And next reach step by step to the desirable knowledge of reading these glyphs, which may cover much historical knowledge of high import. Meantime I have open the path, if my theory and conjectures are correct, as I have strong reasons to believe.

Besides this monumental alphabet, the same nation that built Otolum, had a Demotic alphabet belonging to my 8th series; which was found in Guatimala and Yucatan at the Spanish conquest. A specimen of it has been given by Humboldt in his American Researches, plate 45, from the Dresden Library, and has been ascertained to be Guatimalan instead of Mexican, being totally unlike the Mexican pictorial manuscripts. This page of Demotic has letters and numbers, these represented by strokes meaning 5 and dots meaning unities, as the dots never exceed 4. This is nearly similar to the monumental numbers.

The words are much less handsome than the monumental glyphs; they are also uncouth glyphs in rows formed by irregular or flexuous heavy strokes, inclosing within in small strokes, nearly the same letters as in the monuments. It might not be impossible to decypher some of these manuscripts written on metl paper: since they are written in languages yet spoken, and the writing was understood in Central America, as late as 200 years ago. If this is done it will be the best clue to the monumental inscriptions.

C. S. Rafinesque.

*Philadelphia, February*, 1832.

Note.—While this letter is going to press, we hear of the death of the learned Champollion, a great loss to sciences and erudition. The 3 letters directed to him were written in January, February and March of this year, while his career of usefulness was yet unimpaired; but they were as much intended for the learned all over the world, as for himself, and therefore were printed instead of being sent. The third which is to appear in the next number, will however be inscribed to Klaproth as a substitute.

We have lately heard that the 1st number of 3 excursions to Mitla and Palenque, performed in 1805 to 1807, by Capt. Depaix, has lately been published in Paris under the title of Mexican Antiquities; but it has not reached us.

### 3. Primitive Origin of the English Language.

The best work on the philosophy and affinities of the English language is at present, the Introduction by Noah Webster, to his great Dictionary. Yet although he has taken enlarged views of the subject, and by far surpassed every predecessor, he has left much to do to those future philologists and philosophers who may be inclined to pursue the subject still further: not having traced the English language to its primitive sources, nor through all its variations and anomalies.

But no very speedy addition to this knowledge is likely to be produced, since Mr. Webster has stated in a letter inserted in the Genesee Farmer of March 1832, (written to vindicate some of his improvements in Orthography) that no one has been found in America nor England able to review his introduction! although many have been applied to! But I was not one of those; few knowing of my immense researches in languages, I was not consulted, else I could have done ample justice to the subject and Mr. Webster.

It is not now a review of his labours that I undertake, but merely an enquiry into the primitive origin of our language, extracted from my manuscript philosophy of the English, French and Italian languages compared with all the other languages or dialects of the whole world, not less than 3000 in number!

The modern English has really only one immediate parent. The *Old English*, such as it was spoken and written in England between the years 1000 and 1500, lasting about 500 years, which is the usual duration of fluctuating languages. Our actual English is a natural deviation or dialect of it, begun between 1475 and 1525, and gradually improved and polished under two different forms, the written English and the spoken English, which are as different from each other as the English from the French. These two forms have received great accession, by the increase of knowledge and borrowing from many akin languages, words unknown to the Old English. They are both subject yet to fluctuations of orthography and pronunciation, which gradually modify them again.

The Old English existed probably also under these two forms, and had several contemporaneous dialects, as the modern English, of which the Yorkshire and Scotch dialects are most striking in Europe, while the

Guyana Creole and West India Creole, are the most remarkable in America. Another dialect filled with Bengali and Hindostani words is also forming in the East Indies.

A complete comparison of the old and modern English has not yet been given. A few striking examples will here be inserted as a specimen of disparity.

| Written Old E. | Written Mod. E. | Spoken Mod. E. |
|---|---|---|
| Londe | Land | Land. |
| Sterre | Star | Star. |
| Erthe | Earth | Erth. |
| Yle | Island | Ailend. |
| See | Sea | Si. |
| Benethen | Beneath | Binith. |
| Hewyn | Heaven | Hev'n. |
| Hedde | Head | Hed. |

As late as the year 1555, we find the English language very different from the actual, at least in orthography, for instance—

| Eng. of 1555. | Written Mod. E. | Spoken Mod. E. |
|---|---|---|
| Preste | Priest | Prist. |
| Euyll | Evil | Ivl. |
| Youe | You | Yu. |
| Fyer | Fire | Fayer. |
| Howse | House | Haus. |

This old English is supposed to have sprung from the amalgamation of 3 languages, 1. British-Celtic. 2. Anglo-Saxon and Norman-French, between the years 1000 and 1200. This has been well proved by many and I take it for granted.

But the successive parents and the genealogies of the Celtic, Saxon and Norman, are not so well understood. Yet through their successive and gradual dialects springing from each other, are to be traced the anomalies and affinities of all the modern languages of Western Europe.

By this investigation it is found that these 3 parents of the English, instead of being remote and distinct languages, were themselves brothers, sprung from a common primitive source, having undergone fluctuations and changes every 500 or 1000 years. For instance, the Latin of the time of Romulus was quite a different language from that spoken in the time of Augustus, altho' this was the child of the former, this of the Ausonian, &c.

The following table will illustrate this fact, and the subsequent remarks prove it.

I. Old English sprung partly from the British Celtic.

2d Step. British Celtic of Great Brittain sprung from the Celtic of West Europe,

3d Step. This Celtic from the Cumric or Kimran of Europe.

4th Step. The Cumric from the Gomerian of Western Asia.

5th Step. The Gomerian from the Yavana of Central Asia.

6th Step. The Yavana was a dialect of the Sanscrit.

II. Source. The Old English partly sprung from the Anglo-Saxon of Brittain.

2d Step. The Anglo-Saxon sprung from Saxon or Sacasenas of Germany.

3d Step. The Saxon from the Teutonic or Gothic of Europe.

4th Step. The Teutonic from the Getic of East Europe.

5th Step. The Getic from the Tiras or Tharaca of West Asia. (Thracians of the Greeks.)

6th Step. The Tiras from the Cutic or Saca of Central Asia, called Scythian by the Greeks.

7th Step. The Saca was a branch of the SANSCRIT!

III. Source. Old English partly sprung from the Norman French.

2d Step. The Norman French was sprung from the Romanic of France.

3d Step. The Romanic from the Celtic, Teutonic and Roman Latin.

4th Step. The Roman Latin from the Latin of Romulus.

5th Step. The Latin from the Ausonian of Italy.

6th Step. The Ausonian from the Pelagic of Greece and West Asia.

7th Step. The Pelagic from the Palangsha or Pali of Central Asia.

8th. The Pali was a branch of the SANSCRIT!

Thus we see all these sources of the English language concentrating by gradual steps into the SANSCRIT, one of the oldest languages of Central Asia, which has spread its branches all over the globe. Being the original language of that race of men, fathers of the Hindus, Persians, Europeans, and Polynesians.

All the affinities between English and Sanscrit, are direct and striking, notwithstanding many deviations and lapse of ages. While those between the English and other primitive languages, such as Chinese, Mongol, Arabic, Hebrew, Coptic, Berler, &c. are much less in number and importance; being probably derived from the natural primitive analogy of those languages with the Sanscrit itself, when all the languages in Asia, were intimately connected.

Many authors have studied and unfolded the English analogies with many languages; but few if any have ever stated their numerical amount. Unless this is done we can never ascertain the relative amount of mutual affinities. It would be a very laborious and tedious task to count those enumerated in Webster's Dictionary. My numerical rule affords a very easy mode to calculate this amount without much trouble.

Thus to find the amount of affinities between English and Latin, let us take 10 important words at random in each.

| Wr. Eng. | Sp. Eng. | Latin. |
|---|---|---|
| Woman | Vumehn | Femina. |
| †† Water | Vuater | Aqua. |
| † Earth | Erth | Terra. |
| † God | God | Deus. |
| †† Soul | Sol | Anima. |
| One | Uahn | Unum. |
| †† House | Haus | Domus. |
| † Moon | Muhn | Luna |
| Star | Star | Aster. |
| †† Good | Gud | Bonus. |

We thereby find 3 affinities in 10 or 30 per cent. as many analogies or semi affinities marked † equal to 15 per cent. more, and 4 words or 40 per cent. have no affinities. This will probably be found a fair average of the mutual rate in the Old English; but the modern has received so many Latin synonyms as to exceed perhaps this rate.

Of these analogies, it is remarkable, that most are not direct from the Latin, or even through the French; but are of Saxon origin, which had them with the Latin previously.

Thus the affinities between the English and Greek or Russian, are derived through the Pelagic and Thracian, unless lately adopted.

Boxhorn and Lipsius first noticed the great affinities of words and grammar between the Persian and German dialects: 25 German writers have written on this. But Weston in a very rare work printed at Calcutta in 1816, on the conformity of the English and European languages with the Persian, has much enlarged the subject, and has given as many as 480 consimilar words between Persian and Latin, Greek, English, Gothic, and Celtic; but he has not stated the numerical amount of these affinities. All this is not surprising since the Iranians or Persians were also a branch of Hindus, and this language a child of the Zend, a dialect of the Sanscrit. Hammer has found as many as 560 affinities between German and Persian.

But the late work of Col. Kennedy, Researches on the origin and affinity of the principal languages of Asia and Europe, London, 1828, 4to. is the most important as directly concerning this investigation; notwithstanding that he has ventured on several gratuitous assertions; and has many omissions of consequence.

Kennedy states that the Sanscrit has 2500 verbal roots, but only 566 have distinct meanings; while each admitting of 25 suffixes they form 60,000 words, and as they are susceptible of 958 increments, as many as 1,395,000 words may be said to exist in this wonderful language.

Yet out of these 2500 roots, as many as 900 are found by Kennedy

in the Persian and European languages, although the Greek has only 2200 roots and the Latin 2400. Of these 900 affinities

339 are found in the Greek
319 in Latin
265 in Persian
262 in German
251 in English
527 in Greek or Latin
181 in both German and English
31 in all the 5 languages.

This is something positive and numerical; but unfortunately not definite, and partly erroneous, as will be proved presently for the English. Kennedy denies affinities between the Celtic and Sanscrit, but the very words he has offered as examples (only 100) offer many evident affinities. His opinion that the Hindus and Egyptians came from the Babylonians is very improbable. It was from the high table land of Central Asia that all the old nations came.

The 251 English affinities may be seen in Kennedy, as well as the 339 Latin, which are mostly found now also in English through the words derived from the Latin. These two united would be 590 or more already than the 566 separate meanings of the Sanscrit roots. But Kennedy has by no means exhausted the Sanscrit etymologies of the English. Although I have no English Sanscrit dictionary at hand, yet I have many Sanscrit vocabularies, where I find many words omitted by Kennedy. And what is not found in the Sanscrit itself is found in its Eastern children the modern languages of Hindostan.

Among my vocabularies, the most important is one made by myself of the principal words of the old Sanscrit met with and explained in the laws of Menu translated by Jones. In these old and often obsolete words are found the most striking affinities of which I here give the greater part.

| English. | | Old Sanscrit |
|---|---|---|
| Written. | Spoken. | of Menu. |
| Mother | Mother | Mara. |
| Mind | Maind | Men. |
| Mankind | Mehnkaind | Manavah. |
| Era | Ira | Antara. |
| Hour | Hauer | Hora. |
| Virtuous | Værtius | Verta. |
| Antique | Antic | Arti. |
| Beetle | Bitl | Blatta. |
| Penny | Peni | Pana. |
| Gas | Gas | Akasa. |
| Father | Father | Vasus. |
| Play | Ple | Waya. |
| Malice (sin) | Malis | Mala. |
| Patriarch | Patriark | Patri. |
| Middle | Midl | Medhya. |
| Teacher | Ticher | Acharya. |
| Bos (master) | Bos | Bhos. |
| Before | Bifor | Purva. |
| Wind | Vuind | Pavana. |
| Deity | Deiti | Daitya. |
| Mouth | Mauth | Muc'ha. |
| Eyes | Aiz | Eshas. |
| Right | Rait | Rita. |
| Phantom | Fantom | Vantasa. |
| Wood | Vud | Venu. |
| Me, mine | Mi, maihn | Man. |
| Animate | Animet | Mahat. |
| Spirit | Spirit | Eshetra. |

Being 28 derivated words out of 84 of this old vocabulary. 33 per ct.

Another very singular vocabulary I have extracted from the Transactions of the Literary Society of Bombay, and Erskine's Account of the Ancient Mahabad Religion of Balk from the book Desatir. Some words are given there of the language of the Mahabad empire, the primitive Iran, which appears to be a very early dialect of the Sanscrit and Zend. Out of 30 words 12 have analogies to the English, equal to 40 per cent.

| English. | | Mahabad |
|---|---|---|
| Written. | Spoken. | of Iran. |
| Father | Father | Fiter |
| End | End | Antan. |
| Course | Kors | Kur (time) |
| Nigh | Nay | Unim. |

| | | |
|---|---|---|
| Amical | Amikal | Mitr (friend) |
| Globe | Glob | Gul. |
| Middle | Midl | Mad. |
| Sky | Skay | Kas. |
| Royal | Royal | Raka (king) |
| Ignate | Ignet | Agai (fire) |
| Man | Mehn | Minhush. |
| Donation | Doneshiohn | Datieur. |

I could add here at least 250 to the 251 of Kennedy, if it were not too tedious and long. But I can safely vouch that all the 566 radical roots of peculiar meaning, forming the base of the Sanscrit, are to be found in the English roots, or if a few are lacking it is merely owing to some having become obsolete through the lapse of nearly 5000 years, when the Yavanas, Sacas and Pallis separated from their Hindu brethren, and the revolution of 6 or 7 successive dialects formed by each, till they met again in the English.

Kennedy has even some obsolete English and Scotch words, now out of use, which are derived from the Sanscrit.

This enquiry is not merely useful to unfold the origin and revolutions of our language; but it applies more or less to all the languages of Europe: which were formed in a similar way by dialects of former languages. Since every dialect becomes a language whenever it is widely spread and cultivated by a polished nation. Thus the French, Italian, Spanish, Portuguese, Romanic and Valaquian are now become languages with new dialects of their own, although they are in fact mere dialects of the Latin and Celtic.

The physical conformation and features of all the European and Hindu nations are well known to agree, and naturalists consider them as a common race. The historical traditions of these nations confirm the philological and physical evidence. All the European nations came from the East or the West of the Imaus table land of Asia, the seat of the ancient Hindu empires of Balk, Cashmir and Iran. The order of time in which the Asiatic nations entered Europe to colonize it was as follows, 1 or most ancient.

1. *Esquas* or *Oscans* or *Iberians* or *Cantabrians.*

2. Gomarians or Cumras or Celts or Gaels.

3. Getes or Goths or Scutans or Scythians.

4. Finns or Laps or Sames.

5. Tiras or Thracians, or Illyrians or Slaves.

6. Pallis or Pelasgians or Hellenes or Greeks.

The settlement in Europe of these last is so remote as to be involved in obscurity. But their geographical positions, traditions and languages prove their relative antiquity. The Greek language is one of those that has been most permanent, having lasted 2500 years from Homer's time to the Turkish conquest. Yet it sprung from the Pelagic and has given birth to the Romaic or modern Greek dialects. C. S. R.

## 4. ANTHROPOLOGY.

*The Fundamental Base of the Philosophy of Human Speech, or Philology and Ethnology.*

By C. S. Rafinesque.

The natural history of man and mankind includes so many branches, that some of them have been deemed worthy of the proud title of separate sciences. Such are *Philology* or the science of human speech and languages, with *Ethnology* or the knowledge of nations of a same speech, which are so intimately connected that they can hardly be separated. Ethnology is a very modern science, even later than Geology, and as yet hardly known in America, although much cultivated latterly in Germany and France, being considered an indispensable auxiliary to history and geography.

Horne Tooke has long ago said that *languages cannot lie;* and the most eminent linguists have all

adopted that opinion. Comparative Philology has always confirmed it. The results of the most extensive researches have proved,

I. That words are the elements of languages.

2. That the names given to the most common and obvious objects are their first elements, and the least subject to variations.

3. That words resembling each other more or less are the links uniting the dialects and languages, into groups or clusters.

4. That these words must be such as apply to the same objects, or are synonymous in many cases.

5. That Syntax and Grammar or the modes in which words are modified and combined are subservient to the radical or elementary words, and thus of much less relative importance.

To these obvious results and rules, I add three others which I have myself ascertained.

1. That a small number of these words taken almost at random in two languages or dialects, are sufficient to indicate their degree of analogy, without puzzling ourselves with comparing all the words of both, which may often be impossible.

2. That the degree of similarity, analogy or affinities between 2 or more languages ought to be expressed numerically.

3. That when needful to pursue the enquiry still further or very minutely, the deviations or variations of sounds in the compound words might be divided into 5 or 10 series of successive or combined changes, additions or elision of sounds and letters; whose numbers should express the analogy, and by a division of the total by 5 or 10, the whole numerical and strict amount of identity is ascertained.

To prove the correct principle of these rules, without enlarging much the subject, I shall merely select as an example and illustration the cardinal numbers in 2 well known languages, English and French, so as to proceed from the known to the unknown, as always desirable in science.

I have discovered and applied a strict formula to fulfil these indications, and have thus almost reduced Philology and Ethnology to a *mathematical demonstration* of combined or compound affinities. I call it the *Synoremic formula*, or the Numerical and Analogical Rule. Thus,

*Problem.* A number whatever of elementary words in two dialects or languages being known, to find what is their numerical degree of mutual analogy or reciprocal affinities.

*Answer* or *Solution.* Compare each word, count those which are alike or similar; their amount is the numerical degree of affinity when compared with the whole amount of given words.

*Examples.* Let 10 words be compared, if two are found similar, *the result will be* 2 in 10 = 20 per cent. If 45 words are compared and 20 found similar, the result is 20 in 45 = 44½ per cent.

Till now Philologists in comparing languages had omitted to state upon how many words they had operated. By attending to this important basis of their labours, we shall achieve a great improvement, and give a kind of mathematical certainty to the whole.

I shall not pursue now this formula upon the plan of my 3d rule, so as to find the numerical degree of *identity* of two languages, as it requires many explanations; but the mode, problem, answer and examples are upon the same principle.

Let us apply it to the cardinal numbers in English and French, remembering that these two languages are double in form, having each a written and a spoken dialect: the spoken form will be written on the principles of universal and strict phonology, as far as our letters and signs in use allow it.

| Wr. E. | Sp. E. | Wr. Fr. | Sp. Fr. |
|---|---|---|---|
| One | Uahn | Un | Œn |
| ?two | tu | deux | dœ. |
| three | thri | trois | trua. |
| †four | fuor | quatre | katr'. |
| †five | faiv | cinq | senk. |
| six | siks | six | sis. |
| seven | sev'n | sept | set. |
| eight | eit | huit | hüit. |
| ?nine | naihn | neuf | nœf. |
| †ten | tehn | dix | dis. |

In the 3 numbers marked † there is no affinity, in those two ? the analogy is rather remote.

Thus the English and French languages compared merely by their 10 cardinal numbers, which are a very fair scale in many languages, evince a considerable analogy of 7 in 10 equal to 70 per cent. But if the numbers 2 and 9 with remote analogies are only reckoned for 1, it is reduced to 6 in 10 = 60 per cent. While by the formula of identity, it is still further reduced to 42 in 100 or 42 per cent. of positive identity, derived from the 3 parents of both languages, the Celtic, Teutonic and Latin.

I have been led to this enquiry and mode of investigation, by the wish of finding the affinities and origins of the American nations and languages, which many superficial examiners had pronounced to be involved in total obscurity and impossible to classify, but I have not found them so: by my formula all evince their mutual analogies, whose calculable amount enables us to classify them.

Having further extended this process to many doubtful languages of Africa and elsewhere, and having even compared 3 languages with all the others known, 1. English. 2. Taino or Haytian. 3. Samang of the Asiatic Negros of Malaca; I have come to the surprising and unexpected result, *That all the languages have a greater or lesser affinity with all the other languages;* which fact although it may have been surmised had never been proved, but which can now be proved mathematically. Whence flows another very important category or rule.

*That languages and nations are no longer to be classed or connected by insulated or limited analogies; but by the numerical amount of their total affinities with each of all the other languages.*

This will be found a great step in the historical knowledge of mankind, evolved from the most solid and evident philological proofs. These facts were already partly announced by me in 1824 and 1828, and I can now add that I have thereby confirmed the unity of mankind: since even the negro languages have preserved the indications of their common origin.

In all the American languages I have found the greatest analogies with the Sanscrit, Caucasian, Arab, Mongol, Samoyed and Chinese of Asia. The Copt, Berber, Jolof, Congo, &c. of Africa. The Celtic, Cantabrian, Latin and Greek of Europe. And even the Malay, Tagala, Japanese, Haway, &c. of Polynesia, amounting in some instances to 50, 60, and 70 per cent. of analogy, or from 30 to 60 per cent. of identity.

I shall conclude by giving one instance of these numerous analogies in the Taino of Hayti, Cuba, Jamaica in 1492 and the Guanche of the Canary Islands, now both extinct.

The number of words to be compared was 32, and the followiug 14 are analogous.

| English. | Haytian. | Guanche. |
|---|---|---|
| God | Yocahuna | Corac. |
| | Maocon | Achaman. |
| | Guamochyna | Achicanac. |
| Devil | Tuyra | Yurena. |
| Land | Caya, Xaya | Haave. |
| | Acan, Cati | Kaa. |

| English. | Haytian. | Guanch. |
|---|---|---|
| Priest | { Bohito, Boition<br>{ Behique. Buhui | { Faybo.<br>{ Fayçan. |
| Man | Guani, Cani | Guanch. |
| Mother | Mama | Mama, Ima. |
| Corn | Mahiz | Tamozen. |
| Boat | Canoa, Pagay | Guyon. |
| Water | Ama, Xama | Hamen, Acmun. |
| Milk, Breast | Toa | Aho. |
| Club, Sword | Macana | Masacas. |
| Good | Taino, Guatayo | Antha, Makay. |
| Dog | Cuchis, Gochis | Cuna, Cuncha. |
| Hog, Swine | Zaino | Taguazen. |

Thus the Haytian a dialect of the Aruac spreading from Florida to Brazil, and the Guanch the nearest African dialect of the Atlantic or Berber language spreading from the Atlas to Nubia, have 14 in 32 of mutual affinity, equal to 44 per ct.; which indicates that they were dialects of two akin languages, spoken by two nations that were akin at a period unknown.

Thus a clue is at last afforded to American origins, much more certain than all the previous and numberless theories on the subject. And a solid basis is acquired to build upon, in any future researches and investigation of American origins and history. Klaproth has asserted, and this historical model of research will prove, that languages are even of more importance than features and complexion to distinguish or assimilate human families: thus the speech of man, peculiar to him, shall be found to take the lead even of physical forms and deviations.

*Philadelphia, May* 1831.

## 5. AMERICAN HISTORY.

### ON THE ZAPOTECAS

*And other Tribes of the State of Oaxaca.*

By C. S. Rafinesque.

It is to be regretted that the author of the notice on the Zapotecas of Oaxaca and their temple of Mictla, inserted in the September No. of the Journal of Geology, has remained anonymous: having stated some new historical facts, he ought to have given his name, since he has quoted no authority. For instance to what author had he access to for the names of the two last kings of the Zapotecas, *Cosi-foeza* and *Cosi-xopu?* when did they cease to rule and is there a longer list of these kings?

Some account of these kings and their deeds, as well as the Zapoteca language, which is hardly known, would have been more acceptable to the learned than the notice on Mictla, called Mitla by Humboldt, and already described by him with a figure. Even the true name of the Zapotecas in their own language is unknown, that name being merely a nickname given them by their foes the Aztecas or Mexicans: it means *Apple-people, Tecas* (*people*) and *Zapo* or *Zapotl* a generic name for apples. (Tl added to words answers in Azteca to our article *the.*) It is by these nicknames that the American tribes have been disfigured and swelled beyond truth. The first enquiry in their history is to ascertain their true national name, which is often no easy task.

My authorities for the following account are, Herrera's History of Spanish America from 1492 to 1554, Garcia's Origen delos Indios, Laet, Clavigero, Humboldt, Diaz, Vater, Siguenza, Acosta, Torquemada, Touron, Alcedo, &c.

Oaxaca is a fine province (now

State) south of Veracruz and S. E. of Mexico; it was formed in 1580 by the union of the 2 provinces of Zapotecas and Miztecas: the name being given by the city of Guaxaca, formerly Huacxyacac and now softened into Oaxaca, capital of the estate of Cortez, who was made Marquis of Guaxaca in reward of his conquest or rather invasion of Mexico.

The Miztecas dwelt between the Zapotecas and Mexico; they were a fierce nation, yet at war with the Spaniards and Zapotecas in 1572, and only subdued between 1572 and 1580 (Laet). Their name has been spelt also Mixtecas, Mictec, Mixes, Mixos, Micos, Mecos, Miges, &c. All these names, leaving off *tecas* which means people, imply Lion or rather Cuguar, are animal of the tiger genus, which was the emblem or progenitor of the nation (*Miz* tiger genus in Azteca.) But the Mexicans changed it by contempt probably into *Mic*, *Mix*, or *Mec*, a single word meaning 4 things in Azteca, which are connected in the language, 1. North, 2. Hell, 3. Devil, 4. Apes. This is evidently the root of *Mictla*. *tla* being the article or an abbreviation of *tlan* a place.

It is by this apparently trivial examen and etymology that I have come to the important conclusion that the Miztecas and Zapotecas are the modern remains of the ancient nations of Olmecas and Xicallancas, mentioned in Mexican history as anterior to the Toltecas in Anahuac; and that the *Otomis* and *Chichimecas* were also consimilar tribes. Here it will be needful to refer to ancient traditions, which are not all lost. Although Zumaraga, first bishop of Mexico, and extolled for his zeal by the monks, behaved in Mexico as Omar had done in Egypt, by burning the libraries of Tezcuco, the Athens of Anahuac, (those of Mexico itself had been lost in the siege) he could not destroy all the books scattered through the whole of Anahuac. Many are yet extant, Herrera and Garcias have given some of the traditions of the Zapotecas and Miztecas, neglected by Clavigero and Humboldt. An English Lord has lately published a splendid work on some Mexican Antiquities and manuscripts. The Library of the Philosophical Society of Philadelphia, has the fac simile of an Azteca manuscript which I have decyphered.

The Zapotecas boast of being antidiluvian in America, to have built the city of *Coatlan* (snake place in Azteca) 327 years before the flood, and to have escaped the flood with their king *Petela* (Dog) on the mountain of Coatlan (Garcias.) Which of the two floods of the Aztecas this was, whether that of *Xelhua* or of *Coxcox* is hard to say. The Petela or Dog dynasty ruled over them ever since till the Spanish conquest.

The Coatlatecas (snake people) or Cuitlatecas, the Cuycatecas (singing people) or Cuiscatecas, and the Popaloavas are tribes of Zapotecas, speaking dialects of the same language, of which Clavigero says there is a grammar, but Vater has not given any words of it. I have been able to collect only 12 words of it out of 6 authors.

| | | |
|---|---|---|
| God or Creator of all things | Ahcabohuil. | |
| Spirit | Vinac | |
| House or place | Baa | *Ba* in Mizteca. |
| Brother | Hun | *Cuhua* do. |
| Dog | Petela | |
| Repose or Death | Lio, Leo | *Leob* do. |
| Heaven | Avan | *Andevui* do. |
| Earth | Baca | *Gnuagnuay* do. |
| Hell or Evil | Chevan | *Kuachi* do. |
| Woman | Yxca. | |
| Eve or first Woman | Xtmana. | |
| Adam or first Man | Xchmel. | |

Whereby it is seen that out of 6 words which I have to compare in Mizteca 4 are similar and 2 not very different. Therefore the just conclusion is that the Mizteca and Zapoteca are also dialects of each oth-

er, or languages very nearly related. The same with the Zacatecas.

Of the Mizteca Vater has given many words; he surmises that it is very near to the Othomiz or Otomi: and he considers several other languages of Anahuac as dialects of it; they are the Zoque, Lacandone, Mame, Zeltales or Celdales, Chiapaneca, Mazateca, Chochona, besides the Mixe and Cuiscateca already mentioned. This if true would diminish the number of languages of that region and extend the Mizteca nation far to the South and East in Guatimala, as the Otomi and Chichimecas will extend it far to the North.

I have a good vocabulary before me of the Othomiz language by De Neve 1767, and although only 10 words can be found in the Mizteca of Vater, 5 of them are alike or similar, which gives 50 per cent. of mutual affinity and leaves little doubt of their primitive connection. These words are,

| | (Othomiz) | (Mizteca) |
|---|---|---|
| Father | Hta | Dzutun |
| Land | Hay | Gnuagnay. |
| Nose | Xinu | Dztni. |
| Son | Batzi | Dzaya. |
| Bread | Thume | Dzite. |

The Chichimecas (Dog devils or Northern Dogs in Aztecas) are not a nation, but this appellation was given to all the northern wild tribes and foes of the Aztecas, even to one speaking the Azteca language, and lately to many of the Apaches, Skere or Pani tribes forming a nation spread from Anahuac to Oregon and Athabasca lake, among which the Shoshonis of Oregon bear also the name of Snake Indians as yet.

In result I am led to believe that the Miztecas and Zapotecas were once with the Otomis and many others, the snake nation of America, which did afterwards divide into the Dog and Cat tribes or Zapotecas and Miztecas. The same has happened in Asia and North America where many nations ascribe their origin to Snake-men, Dog-men and Cat-men or people.

The Olmecas or Olmec or Hulmecs of ancient Anahuac, whose name means *Old Devils* in Azteca, are said to have settled in Anahuac after the Othomiz, but with their allies the Xicallaneas or Xicayans, whose name we may recognise in the Cuycatecas of modern times, and were probably the old Zapotecas, the Southern Miztecas are yet called Xicayans.

Their settlement is so ancient that it is beyond the Azteca and even Tolteca chronology. It happened after the sway of Gods, Giants and Apes (different nations.) They conquered and expelled the Giants or Titans of Anahuac called Tuinametin and Tzocuitlixeque, and took the name of Tequenes or People of Tygers. They were divided into 3 tribes, Olmecas, Xicalans and Zacatecas speaking the same language! (see Torquemada.) They came from the snowy mountains, and united for this conquest under the king Coxanatecuhtli, building many cities and ruling a long while over Anahuac.

Another tradition traces the origin of the Hulmecas to Hulmecatl brother of Xelhua, the Noah of Anahuac, and indicates several dynasties ruling successively their empire, 1. Ulmec, 2. Cochoblam, 3. Quetzalcoatl, the famous Legislator of Cholula, 4. Huemac, and ends by Colopecthtli last king killed by the Tlascalans towards 1196 of our era, who drove them to the East settling in their country. The last we hear of the Ulmecas in the Aztec history is in 1457 and 1467 when those of Cotasta on the sea shore were conquered by Montezuma I. While this name disappears from history, that of the Miztecas and Zapotecas appears in the same place or to the S. E. of Mexico, and thus the evidence is complete that they were the same nation under different names.

In 1454 the Miztecas won a great battle over the Aztecas and their al-

lies, whose real sway in Anahuac only began towards 1425 and hardly lasted one century. In 1455 Atonaltzin king of Miztecas although helped by the Tlascalans was taken and his kingdom conquered. This king is elsewhere called Yaguitlan.

The Miztecas rebelled in 1480, and in 1486 the Zapotecas resisted the whole power of Mexico. But at last became tributary; yet in 1506 and 1507 they both were at war again with Mexico.

Although overjoyed at the downfall of the Mexicans, effected by 100,000 Tlascalans and allies among which were some Miztecas, and 900 Spaniards under Cortez: they did not readily submit to the Spanish yoke and tribute after the fall of Mexico in 1521.

In 1522 the Zapotecas defeated Sandoval, and were only conquered in 1526 by Olmedo (see Diaz,) but they have often rebelled against the Spaniards. In 1572 the Miztecas were at war with the Spaniards and the Zapotecas; these had been conciliated by the mild rule of their Lord Cortez, who established only a small quit rent on land, without any forced labour: this system has made Oaxaca a flourishing city and province.

The Zapotecas and Miztecas are represented as the handsomest Indians of Mexico, nearly white, and the females are beautiful, as white as the Spanish women. This also happens in Zacatecas, a province of the former Olmecas: therefore it appears that this race is distinct from the Azteca or Mexican nation in features as well as languages: notwithstanding that some writers wrongly assert that the Olmecas spoke the same language as the Aztecas and Toltecas. The Mixes have sometimes long beards and resemble European; they are a tribe of Miztecas. Thus we find by investigation that the nations and languages of the Mexican States are as easily reduced to a small number as those of the remainder of North America.

The Theogony, Cosmogony and religion of the Miztecas and Zapotecas was also very different from the Mexicans, although they had latterly adopted their bloody rites of the god of evil. The Miztecas of Cuilapo according to a book written by a Spanish monk in the Mizteca language and figures, (preserved by Garcias) ascribe their origin to a god and goddess named *Lion Snake* and *Tyger Snake* dwelling in *Apoala* or heavenly seat of Snakes before the flood. They had two Sons (or nations) an eagle called *Wind of* 9 *Caves*, and a Dragon or Winged Snake called *Wind of* 9 *Snakes*. They were driven from *Apoala* for their wickedness and perished in a great flood. In *Apoala* we find the *Tlapala* or ancient seat of the Mexicans: which is perhaps the *Apalachi* mountains of North America, where was once the holy mountain, temple and cave of *Olaimi* (see Brigstock) which name recalls to mind the *Olmecas!* and all these names answer in import and sound to the *Olympus* of the Greeks.

The Zapotecas had similar but more definite ideas. *Ahcabohuil* was the Creator of all things; but a divine man and divine woman *Xchmel* and *Xtmana* were the progenitors of mankind and of the 3 great gods *Avan* god of heaven, *Baca* god of earth and *Chevan* god of hell. These 3 brothers are surprizingly alike in import and names with the Trimurti or triad of the Hindus, the 3 manifestations of the Deity *Vishnu*, *Brama*, and *Shiven!*

This same triad was worshipped in Chiapa, Yucatan, Hayti and many other parts of America, under names not very unlike, such as

Izona, Vacah and Estruah in Chiapa.

Izona, Bacab and Echvah in Yucatan.

Bugia, Bradama and Aiba in Hayti.

Iao, Isnez and Suroki by the Apalachians.

Yah, Wachil and Wacki by the Natchez.

Quoyoh, Kiwas and Ocki in Virginia and Florida.

Zungua, Quexuga and Haraqui by the Chicolas.

Garronhia, Tahuisca and Oyaron by the Hurons.

Amane, Vaca and Vochi by the Tamanacs.

Akambue, Ichein and Maboya by the Caribs.

Apu, Churi and Voqui in Peru.

Pillian, Meulen and Wocuba in Chili.

Nemque, Zuhe and Bochica by the Muyzcas.

Guipanavi, Avari and Caveri by the Maipuris.

Aygnan, Tupan and Mabira in Brazil, &c.

Are not these coincidences very surprizing and interesting for the history of mankind and of their religions? They will appear still more so if we compare them with the different triads of Asia and other parts. Sometimes the Asiatic names are more dissimilar between themselves than the American, or else resemble still more some of them. A few instances will be sufficient to prove this strange fact.

*Asiatic Triads.*

Brimha, Vistnow and Etcheves.

Tama, Satua and Raju.

Pramih, Bichen and Sumbreh.

Angeor, Okar and Gun.

Braham, Narayan and Mahesa.

Brahima, Bala and Mahadeo.

Brumany, Ramana and Rudra.

Primah, Krishna and Iswara.

The above by the Hindus in different modern languages of India, Decan, and Indostan: which are all dialects of the Sanscrit.

Prahma, Aug and Codon in Siam and Ava.

Bahman, Homi and Barzoi of Iran.

Bahman, Manistar and Tamistar of the Mahabad.

Hum, Fo and Kya, of Thibet.

Y, Hi and Vi of the Tao religion of China.

O, Mi and To of the Fo religion of China.

Eon, Hesu and Pur of the Phrygians.

Samen, Phegor and Zebu of the Syrians

*African Triads.*

Amon, Mouth and Khous of Egypt and Thebes.

Ucharan, Ahicanac and Guayota of the Guanches.

*European Triads.*

Olcus, Pan and Ath of the Cyclopians.

Prome, Epime and Mene of the Pelagians.

Pan, Eros and Methusa, of the Greeks.

Zeus, Poseidon and Hades of the Greeks.

Ian, Aesar, and Sancus of the Etruscans.

Ain, Aesar and Taut of the Celts.

Bram, Amen and Vix of the Oscans.

Kog, Om and Pax of the Eleusinian mysteries.

Molk, Fan and Taulas of Hibernians.

Odin, Vile and Ve of Scandinavians.

Perun, Morski and Nya of the Slavonians.

*Polynesian Triads.*

Biruma, Vishnu and Uritram of Ceylan.

Awun, Injo and Niwo of Japan.

Tane, Akea and Miru of Havay.

Tani, Uru and Taroa of Taiti, &c. &c.

The order of these divine manifestations is of little consequence and depends upon the priority of those mostly worshipped, whether the God of Heaven, Earth or Hell. The Hindus have now two Sects worshipping Vishnu and Shiva, but Brama has few worshippers at present.

These names would appear still more strikingly alike if they all meant the same: but they often mean

the past present and future, or power, life and death, or the rising blazing and setting of the Sun or some other consimilar ideas instead of heaven, earth and hell, although they always apply to the triple manifestations of the Deity distinguished and personified in Creation, Preservation and Destruction. This subject which might be pursued much further, may indicate a primitive conformity of religious ideas in mankind all over the world.

Seventeen languages and dialects of Anahuac or the Mexican States are said to have been reduced to grammars and dictionaries by the Spanish missionaries; Vater and the other philologists do not appear to have known them all. In order to draw thereon the attention of those who dwell in Mexico, I shall attempt to enumerate all the Mexican dialects under 4 series, 1 well known, 2 Little known, 3 Hardly known and 4 Totally unknown to the learned and historians. It will be obvious that the 2 latter series require chiefly the attention of those who may have the opportunity to travel or dwell in Mexico.

1st Series. Languages or dialects well known of which we have ample vocabularies and grammars known to the learned—1. Azteca or true Mexican. 2. Otomi. 3. Mizteca. 4. Maya. 5. Cora. 6. Totonaca. 7. Pima. 8. Poconchi.

2d Series. Little known to the learned at least, but well known in Mexico as there are grammars &c. of them. 1. Tarasca. 2. Huasteca. 3. Yaqui. 4. Popoluca. 5. Matlazinca. 6. Mixe. 7. Kiche. 8. Cachiquel. 9. Tarahumara. 10. Tepehuanan, &c. Of these I have procured already ample vocabularies of the two first.

3d Series. Hardly known, of which we possess as yet but few words. 1. Zapotecas. 2. Zacatecas. 3. Chol. 4. Chontal. 5. Pininda. 6. Opata. 7. Endeve. 8. Quelene, &c.

4th Series. Quite unknown for lack of materials, although they are yet spoken languages, and some are but dialects of those above. 1. Utlateca. 2. Cohuichi. 3. Tlahuichi. 4. Zoque. 5. Mame. 6. Chiapaneca. 7. Chochona. 8. Mazateca. 9. Cuiscateca. 10. Popaloava. 11. Tubar. 12. Yumas. 13. Seres. 14. Moba, &c. Besides many dialects of California, Texas and New Mexico.

Although they may be mere dialects it is needful and desirable to have materials on each, so as to reduce this to a certainty and to trace their mutual analogies or deviations, as well as the probable time of the separation of the tribes.

These 40 Mexican dialects will thus be reduced very probably to 5 or 6 primitive languages, as those of the United States have already been reduced to seven, the Onguy, Lenih, Chacfah, Otaly, Capaha, Skere, and Nachez, by myself in the manuscript history of the American nations. And in the whole of North and South America hardly 25 original languages and nations are met with, although actually divided in 1500 tribes and dialects; as the actual European languages, only 6 in number originally, are now divided into 600 dialects, some of which are even deemed peculiar languages at present.

Thus these original or mother languages of Europe are the Pelagian, Celtic, Cantabrian, Teutonic or Gothic, Thracian or Slavonian, and Finnish. And out of the Gothic have sprung the English, Dutch, German, Danish, Swedish, &c. which were once mere dialects, but are now become languages having many dialects of their own.

## 6. History and Zoology.

### *The Domestic Animals of Mankind and the American Nations.*

By C. S. Rafinesque.

I mean by domestic animals those which have been tamed by mankind, and dwell in freedom with men, becoming subservient to their use; by no means those which are pursued or kept in chains and cages.

The number of these domestic animals has always been deemed a standard of civilization, and the cultivation of plants is another.

The slanderers of the American nations (Robertson included) have not been willing to perceive any high civilization in this continent, and have totally overlooked the numerous animals they had domesticated.

In America the number of domestic animals was greater than in Asia, Europe and Africa! this assertion is not a paradox; but a positive fact, which I shall presently prove completely. I do not mean to include among the domestic animals of this Continent, those introduced since 1002 by the Scandinavians, nor since 1492 by the Spaniards; but merely those domesticated by the primitive and ancient nations of America.

I shall form two collateral tables of the domestic animals of the two Continents, and afterwards quote my authorities for those of America; since in the actual state of our knowledge, so much that relates to America is endeavoured to be forgotten, that it becomes needful to recall continually the ancient authors which our popular writers are too lazy to read, consult and adopt.

Abbreviations in the Table.

N. A. North America. A. Asia.
S. A. South America. E. Europe.
W. I. West Indies. Af. Africa.
M. Mexican States. P. Polynesia.

This being intended as a popular Essay, I shall give the common names of animals merely.

1st TABLE.

*Domestic Animals of America.*

I. QUADRUPEDS.

1. Lama
2. Paco
3. Taragua
4. Huanuco

(4 Species of the G. Vicunia, S. A.)

5. American Bison, N. A.
6. American Elk, N. A.
7. Virginian Deer, N. A.
8. American Bear, N. A.
9. Pecari Hog, S. A.
10. Tayasu Hog, S. A.
11. Dog—7 varieties, N. A. S. A. & W. I.
12. Aguti
13. Cavia
14. Paca
15. Huti

(4 Species of Rabbits but of different genus. S.A. & W.I.)

16. Tapir, S. A.
17. Capibara, S. A.
18. Coati, M.
19. Raccoon, N. A.
20. American Badger, N. A.
21 to 31. 10 Species of Monkeys in S.A.
32. Flying Squirrel, N. A.
33. Manati or Sea Cow, W. I. and S. A.

2d CLASS.—BIRDS.

1. American Hen, N. and S. A.
2. Musky Duck, S. A.
3. Manedis
4. Powis or Agami
5. Hoco
6. Wacarara

(Domestic Fowls of Guyana.)

7. Turkey, M.
8. Cocolin Quail, M.

2d TABLE.

*Domestic Animals of Asia, Europe, Africa and Polynesia.*

I. QUADRUPEDS.

1. Common Camel, A. E. and Af.
2. Bactrian Camel, A.
3. Common Ox, A. E. Af.
4. Buffaloe, A. E. Af.
5. Asiatic Elephant, A.
6. Horse, A. E. Af.
7. Ass, A. E. Af.
9. Hog, every where.
10. Dog, (15 varieties) do.
11. Cat, do.
12. Ichneumon, Af.
13. Rabbit, E.
14. Ferret, E.
15. Sheep, A. E. Af.
16. Goat, A. E. Af.
17. Antelope, A. Af.
18. Yak or Thibet Cow, A.
19. Reindeer, E. A.
20. Ounce, A.
21. Marmot, E.
22. Otter, A. E.
23 to 25. 3 sp. Monkeys in Asia and Af.

2d CLASS.—BIRDS.

1. Hen, every where.
2. Pidgeon, do.
3. Goose, do.
4. Duck, do.
5. Swan, do. rare.
6. Guinea fowl, Af. E.
7. Peacock, A. E.
8. Pheasant, A. E.

| | |
|---|---|
| 9. American Crane, N. A. | 9. Partridge, E. |
| 10. American Pidgeons, N. A. | 10. Quail, E. |
| 11. Canada Goose, N. A. | 11. China Diver, A. |
| 12 to 25. Parrots 14 sp. S. A. and W. I. | 12 to 19. Parrots, 8 sp. A. 6. |
| 26 to 28. Ducks 3 sp. in Brazil and Peru and M. | 20. Dove, A. E. |
| 29. American Ostrich, S. A. | 21 to 25. Falcons and Hawks, 5 sp. A. E. |
| 30. Flamingo, in Cuba. | |
| 31. Ringdoves, N. A. | |
| 22. Carib Goose, W. I. | |
| **3d CLASS.—REPTILES.** | **3d CLASS.—REPTILES.** |
| 1 to 5. Land and Water Turtles, 5 species, S. A. | 1 to 3. Land Turtles, 3 sp. |
| 5 to 8. Iguanas, 3 species. | 4 to 10. Snakes, 7 sp. |
| 9. Rattle Snake, N. A. | |
| 10 to 15. Harmless Snakes, 6 sp. M. and S. A. | |
| **4th CLASS.—FISHES.** | **4th CLASS.—FISHES.** |
| 1. Remora, W. I. | 1 to 10. Sp. of Carps, and Pond fishes, Gold fish, &c. China, A. E. |
| 2 to 12. Pond Fishes of M. Guatimala, Peru, &c. | |
| **5th CLASS.—INSECTS.** | **5th CLASS.—INSECTS.** |
| 1 to 3. Bees, 3 sp. S. A. | 1. Honey Bee, A. E. Af. |
| 4. Red Cochinille, M. | 2. Silk Worm, A. E. |
| 5. Monteres or Yellow Cochinelle, M. | 3. Kermes, E. |
| 6. Silk Worm of Mizteca, M. | 4. Fig Cynips, E. |
| 7. Cucuyo or Acudia, W. I. | |
| 8. Termes, S. A. | |
| **6th CLASS.—SHELLS and WORMS.** | **6th CLASS.—SHELLS and WORMS.** |
| 1 to 5. Oysters, 5 kinds, N. and S. A. | 1. Oysters, E. |
| 6 to 10. Clams and Shells, 5 sp. N. and S. A. | 2. Muscles, E. |
| 11 & 12. Palm Worms, 2 sp. S.A. & W.I. | 3 to 5. Other Shell Fish, E. |
| | 6. Pinna or Bissus, E. |
| **RECAPITULATION.** | **RECAPITULATION.** |
| 33 species of Quadrupeds. | 25 species of Quadrupeds. |
| 32 " Birds. | 25 " Birds. |
| 15 " Reptiles. | 10 " Reptiles. |
| 12 " Fishes. | 10 " Fishes. |
| 8 " Insects. | 4 " Insects. |
| 12 " Shells and Worms. | 6 " Shells. |
| 112 Species in America. | 80 Species in the other Continent. |

Such a great number of domestic animals were not collected every where; but a small number found in different localities in America and elsewhere.

The domestication of animals began before the flood, since the *Abelites* or Pastoral tribes, and the *Cabulites*, *Cabils*, or *Cainites*, agricultural tribes had at least reclaimed the sheep and the ox soon after Adam. Yet in the earliest Chinese history only 6 domestic animals are stated to have been reclaimed by the *Fuhites* 300 years after the flood of Yn-ti or Noah, which were the horse, the ox, the sheep, the dog, the hog and the hen.

The other animals were gradually tamed elsewhere. Some are of local and limited range, such as Yak confined to Thibet, Ferret to Europe, Reindeer to the Boreal Regions. Europe has only received the Buffaloe and Camel lately from Asia; and since 1492 some of the American domestic animals have been introduced there. Such as the Cavia,

Turkey, Musky Duck, and several Parrots.

In America the 4 kinds of Vicunia or Peruvian sheep were spread by the Peruvians to Chili, Tucuman, Paraguay, &c. and the Dog was found every where; while the domestic Tapir, Tayasu and Pecari were confined to some small tracts in South America. The common Virginian deer is found wild all over North America; but we hear of its domestication only in Florida.

Let us detail the proofs of the American table drawn from the earliest travellers and writers on this continent. The domestic animals of the Mexicans were several kinds of dogs, deer, fowl, ducks, cocolin, turkey, snakes, fishes, cochinille, &c. See Cortez, Herrera, Clavigero, and all the writers on Mexico.

The Taensas, Cenis and other nations of Texas and Louisiana, had tame turkeys, ducks, hens, pidgeons and ringdoves, 150 years ago, when independent, see Lasalle, Tonty and Hennepin.

In 1678 the Chicasas had tame Indian hens and turkeys, see Tonty's travels.

In Xalisco to the N. W. of Mexico, several snakes were tamed and kept in the houses, to destroy insects. In other parts of Mexico the beautiful coral snake was kept as a pet by the women. See Herrera and Purchas.

Ayllon who explored Chicora or Chicola the eastern part of Florida now Georgia in 1514, &c. found there tame ducks and geese, and besides deer kept like cattle in folds during the night, ranging out in the day, returning home in the evening; the does were milked like goats, and the Indians drank the milk. See Ayllon's relation in Peter Martyr d' Angleria.

The first Spanish explorers of New Mexico or Cibola found the bison or American buffaloe kept in folds and pens, like cows. See Herrera, Hackluyt, &c.

Lawson in his travels in Carolina towards 1700, says that the Congaris and Wateris had tamed the American crane.

The Miztecas of Mexico raise a kind of silkworm to this very day, see Poinset: it is a native kind.

In the West Indies, the beautiful bird flamingo or the *Phenicopterus ruber* had been tamed in 1494, in Cuba; also several large parrots, and even a fish the Remora or *Echeneis* which was used by the fishermen to catch turtles and fishes by grasping them. They had also tame partridges and iguanas in 1508. See Columbus, Diaz, Ocampo, Acosta, &c.

In Hayti they had tame iguanas, manatis or sea cow, and several kinds of rabbits or agutis. They also used the cucuyo or fire-fly as a convenient light. See Columbus, Martyr, Acosta, Munoz, &c.

Several tribes of North America have tamed the bear, the raccoon, the badger, and keep them in their houses to this day. The flying squirrel is a common pet with the boys and girls.

In Guatimala and South America many species of monkeys were tamed and kept in houses; but we are seldom told which species they were. The Aruwacs of Guyana delight to keep the beautiful little monkey called sucawin, not larger than a rat. See Bancroft, Bolingbroke, Stedman, Strangeways, Acosta, Herrera, &c.

In Darien and Yucatan there were herds of tame pecaris kept like hogs according to Herrera, before 1540.

The Epurimei of Guyana kept tame pecaris, tayasus, and deer. See Purchas. This deer must be different from the Virginian deer and must be added to the table.

The 4 kinds of tame fowl of Guyana are mentioned by Waterton; but they are spread under other names as far as Guatimala and Brazil.

In 1519 Pigafetta found the Aruayas of Brazil with tame geese, fowl, parrots, monkeys, and also

the tapir or anta had been tamed by them. He found also the patagons with tame huanacos.

The Diaguitas of Tucuman had tamed the ostrich, also geese and hens before 1550. See Techo.

Four species of rabbits, *Paca nigra* and *Paca fulva*, *Cavia aguti* and *Cavia acuchi* were domesticated from the West Indies to Peru and Paraguay, under various names, *Capis* and *Cuyus* in Peru, *Papos* on the Maranon and among the Guaranis as early as 1534. *Quinaxes* in Quito, *Aperea* in Brazil, *Hutia* in Hayti, &c.

Dogs wore found from Canada to Chili; some peculiar varieties existed: the alco of Mexico had no hair and was very good for food: the aperuca of Peru was a black dog.

The Muras or Aymores of Brazil and E. Peru had many kinds of tame fowls and ducks. Acuna mentions that 200 years ago the tribes of Maranon had tame turtles, manati, anta or tapir, pecari and paco.

Of the five species of Vicunia, the Peruvians had tamed 4, the true mountain Vicunia alone remaining wild and untamable. They were used as beasts of burthen, for wool and food. Sometimes even as horses to ride upon by the Achkeres of West Brazil in 1540 and the mapais, or mbayas of tucuman in 1548; they called the lama by the name of Amidas. The tribes of Chaco had in 1548 tame deer, lama, geese, and they cultivated a kind of wheat and of rice. See Gili, Lozano, Lavega, Schnidel, Purchas, &c.

The Panches of Cundinamarca kept the large ants or termes in yards to breed, using them to make a kind of bread. See Piedrahita and Touron.

The Carios of River Parana had tame lamas, pecaris and geese in 1539; see Schnidel's Travels.

The Chilians, Araucas and Huenus or patagons had tame guanacos and goats: they cultivated 2 kinds of wheat.

The partridges of Maranon have been omitted in the table. They must be different from those of Cuba. The Caribs had tame geese and parrots in 1493 at Guadalupe when discovered by Columbus.

In Chiapa a yellow cochinille is raised called monteres; see Juarro. The true cochinille of Oaxaca and E. Mexico is well known. The same or a different kind is also found in Guatimala and Guayaquil.

In Collot's travels I find that the Alitans or Snake Indians of New Mexico, keep tame rattle-snakes, which they venerate, and feeding them on flour only, they lose their poisonous property! this is strange if true.

The capibara is tamed in Brazil, the coati in Guatimala, the American elk is easily kept in parks and folds. The beaver alone, so useful and so sociable, has never been tamed, but wantonly destroyed.

Some Indian tribes took care to spread and keep the oysters, pearl oysters, muscles, clams, &c. The palm worms esteemed a delicacy in Guyana were taken care of, as well as 3 kinds of bees. See travels in South America.

The result of this Enquiry will be that more animals have been tamed than we were aware of, particularly in America, and that the Americans had little cause to regret lacking the horse, camel, ox, sheep, goat and hog, since they had for equivalent the vicunias, deer, bison, pecarris, tapir, &c.

I have long been convinced that the civilization of many American nations, such as the Toltecas, Mexicans, Tarascas, Apalachians, Mayans, Quiches of North America, and the Muhizcas, Peruvians, Araucanians of South America, was not so low as represented by their tyrants and detractors; but equal if not superior to that of the Spanish invaders of 1492: which fact will be easy to demonstrate; but this is neither the time nor place. I have merely illustrated one of the many proofs of

their civilization, by introducing a subject which had been overlooked by all, even Humboldt, and Macculloh.

Two species of deer, the Mexican and Guyana deer must be added to the table, also the Puda goat of Molina tamed in Chili: and 5 species of birds, the partridges of Cuba and South America, besides the American swan and pelican, both of which I have seen domesticated. Thus the American domestic animals will be increased to 120 species. I have also seen buffaloes, elks and deer in parks in Kentucky, in freedom, yet coming at the call to be fed with corn or salt, and never endeavouring to escape from a park merely surrounded by a common fence. Such was the park of Col. Geo. Thompson at Shawanee Spring near Harrodsburg.

## 7. ZOOLOGY.

### *On the Moles of North America and two new species from Kentucky.*

By C. S. Rafinesque.

The moles like many of the small quadrupeds of this continent, are hardly known and distinguished as yet. Several of them have been mixt in the genera *talpa*, *sorex*, *scalops*, *spalax*, *condylura*, &c. of the naturalists. In Harlan Fauna Americana the G. *spalax* is omitted, as well as the *tuzan* of Mexico and Louisiana, and the N. G. lately discovered in Maine. He has only one mole or *talpa* of North America and he deems it the T. *europea* saying in the character *fur black*, and in the description *fur cinereous*, *fan on the throat*, &c. and then he has 4 varieties *spotted*, *white*, *yellow* and *cinereous* again.

All the animals burrowing and raising the earth in ridges are called moles in the vulgar language: although they may not all be *talpa*; the shrews are the G. *sorex*.

In 1814 I distinguished one of the moles found in the Atlantic States by the name of *talpa cupreata* (precis. sp. 7.) which I had observed in 1802, it differs from the European kind, which *I have seen in Europe*, by tail one seventh of whole length, colour of a shining brown with coppery purplish shades, throat slightly fulvous. The European mole may be found somewhere in North America, but I have never seen it.

In 1820 I described in my Annals of Nature, sp. 5. the *spalax vittata*, with striped back, &c. The compilers who seldom travel and neglect the published labours of travellers who have wandered in search of knowledge; have not noticed these two species. This last however has been also seen by my friend Audubon, who first made it known to me, and is inserted in the English Journal of Zoology of 1822. The G. *spalax* of Erxleben contains the mole rats without tails.

Mr. Harris of Machias in Maine, has discovered and described a very singular mole of that State, which he deems a N. G. and calls *astromycter prarinatus*. Not being yet introduced in the books of compilers, I'll give a short account of it. G. *astromycter*. Snout stellated, no external ears, eyes small, legs short 5 toes to each, anterior scaly with long strait claws, posterior longer with shorter curved claws, tail scaly, fusiform, with thin hairs.

Sp. *A. prasinatus*. Hair glossy green, snout naked long with cartilagineous stellated processes, and two others longer before: tail pedunculate, fusiform, cylindrical, acute, two fifths of whole length; body 4½ inches, tail 3.

In 1820 I discovered two new moles in Kentucky, one is rather common and the substitute of the common mole in the gardens. I call it *talpa macrhina*. The other *talpa sericea* is rather scarce. A specimen was in Clifford's museum.

1. *Talpa machrina*, Raf. 1820.—Long-nose mole. Fur thick, brown with greyish shades; nose elongate, depressed, naked and tuberculate; tail one sixth of whole length white, squared, naked, feet white.

Total length 7 inches, tail 1¼ but only ¾ out of the fur. Body thick, covered with a soft silky fur ½ inch long, shorter and woolly on the head; nose almost like a proboscis ½ inch longer than the lower jaw, moveable, base white villose, and naked rubicund; feet naked, the anterior broad, rounded flat with 5 toes thick and subpalmate or coherent, 5 claws nearly equal, large, convex above, flat beneath; posterior feet more slender, claws smaller, longer and narrow. In woods, gardens and fields, near Lexington, &c. Raises flexuose burrows of great length.

2. *Talpa sericea.* Raf. 1820. Silky mole.—Fur short silky, grey, with silvery shades; nose short obtuse; tail one fifth of whole length cylindrical.

Smaller than the first and more slender, only 5 inches long, body 4 and tail 1. Fur very peculiar and different from the other moles, not being reducible to different directions; but imbricate as in other quadrupeds; remainder as in the first sp. Found in woods near Nicholasville and Harrodsburg.

8. *Description of a New Otter,* LUTRA CONCOLOR *from Assam in Asia.*

Dr. M. Burrough of Philadelphia, has been a great traveller and collector in Zoology, having made a voyage round the world, travelled in Peru, Panama, West Mexico, Sandwich Islands, and Bengal. His greatest Asiatic excursion was a journey from Calcutta to Assam in the Imalaya mts, by the Baranputra river; it is to be wished that he may publish his Journal of it. He has brought to Philadelphia some fine or new animals and many shells.

Among his quadrupeds, he has an otter from Assam, which I pronounced new, and he has permitted me to describe. I call it *lutra concolor*, being of a uniform color; it might also be called *L. amblonyx* from its blunt claws.

S. G. *Amblonyx*, Raf. Claws short obtuse, not sharp nor crooked; while they are so in the other otters.

*Lutra concolor.* sp. ch. Entirely of a uniform bay color, tail depressed as long as the body, claws blunt.

Description.—Total length 2½ ft. head and neck ½, body and tail each one foot; nose blackish, no whiskers, ears very small; six small close incisores to each jaw, canine teeth large, grinders sharp; feet short, with 5 unequal palmate toes, and claws as above stated; tail slender flat acute.

Found in Assam and the Garrow hills. Dwells mostly on land, seldom goes to the water; feeds on fish and fowl. C. S. RAFINESQUE.

*Philadelphia, 27 March,* 1832.

P. S. Dr. Burrough has again sailed on another voyage to Buenos Ayres and China, from whence he will no doubt bring many rare objects of Zoology.—May 1832.

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9. COUGUARS of OREGON. By C. S. R.

In addition to the article on our Couguars, p. 19, I have to state that several other varieties of tygers are found in the Western wilds of the Oregon Mts, or East and West of them, which deserve to be noticed.

I find in my notes that two other varieties of Couguar have been seen there, and East of the Mts.

1. Var. *Oregonensis.* Dark brown, nearly black on the back, belly white; body 6 ft. long, 3 high, tail 2 or 3 ft. long. A large ferocious animal of the mountains. Is it not a peculiar species? *Felix oregonensis.*

2. Var. Very near the Pennsylvania or rather Alleghany Couguar. Body nearly entirely tawny or bay, rather shorter, smaller and lower than the last, more slender, less feroceous. Dwelling in the plains east of the mountains near woods, but pursues the game in the plains or prairies, preying on deer, elks and buffaloes.

I find in Leraye's travels that a smaller animal, nearly similar in color, but not larger than a cat is

found east of the Oregon mountains, which is very fierce, and often kills large animals, wild sheep and goats by jumping on their necks and cutting the flesh and arteries, until they fall. Is it a new species?

*Felis macrura*, Raf. Entirely of a sallow color, tail as long as the body, which is from 1 to 2 feet long only.

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10. Ornithology.—Description of a new Eagle from South America, *Aquila dicronyx* or Macarran Eagle. By C. S. R.

Mr. Macarran of Philadelphia has had for 5 years in his small menagerie and botanic garden, a beautiful eagle, kept alive in a cage in the open air during the coldest winters, being a native of the cold climate of Antartic America. He was found by the mate of a vessel near Buenos Ayres, while yet young, feeding on a dead horse, and taken alive without much difficulty. He has grown and improved in colors since bought by Mr. Macarran. Although fierce and wanting to fly against the boys when they annoy him, he is very tame and grateful towards his keeper: he knows him as well as friendly visiters, and greets them by peculiar postures, looks or cries. He has several kinds of cries rather harsh, to express joy or anger. He feeds on every kind of flesh, offals or even fish and dead animals. He will kill rats and eat them. He is a beautiful noble bird, when he expands the wings they fill his large cage. His gait is clumsy and he oftener jumps than walks.

I have called him *Aquila dicronyx* from the singularity of claws of two colors.

*Aq. dicronyx*. spec. ch. Bill horny, feet yellow, claws black, but the middle claw horny or whitish; plumage blackish, head greyish, tail whitish, end of it rusty.

*Description.*—Total length 3 feet, wings expanded, 9 feet; bill large strong 4 inches long, shaped as in the eagles, of a horny or whitish-yellowish color; cere and lore brownish; eyes black and bright, iris yellow; head greyish above and across the eyes, nearly white beneath and above the eyes; feathers nearly black with a lead colored cast, white at their base; wings slate colored beneath; Uropygial feathers mixt of black and grey. Tail with a rusty band at the end. Feet yellow very strong, feathers not quite to the toes. Claws strong and black, that of the middle toe same color as the bill.

When younger this bird was entirely of a bluish black, or dark lead color, the head and tail have since changed, but the rusty band of the tail and claws were permanent and are proeminent distinctions between this eagle and the whitehead eagle.

Mr. Audubon admired this eagle and wanted to purchase him; but Mr. Macarran would not take less than $ 100 for him.

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11. Erpetology.—On the Salamander of the hills of East Kentucky. *S. lurida*. by C. S. R.

I discovered in 1823 a new land salamander in my excursion to the falls of the river Cumberland, dwelling in the hills near that river in East Kentucky, among logs and rubbish in woods.

It is a sluggish and ugly animal, but rare and not easily detected among dried leaves, being of a dull color, only 3 or 4 inches long.

*Salamandra lurida*. Entirely grey with two rows of black spots on the back, tail as long as the body with blackish rings, belly whitish. The tail is rounded as in the land salamanders, and the toes are 4 and 5 as in the whole genus.

I take this opportunity to state that my sal. or sp. *lucifuga* of last No. is different from the *Salamandra longicauda* of Green, having compared them, I find by specimens of this last, that the dots are larger, fewer, rounded, and lacking beneath; head smaller not so flat, mouth smaller with minute acute

teeth in both jaws; but the eyes are nearly alike and both have the nictitant membrane very properly compared to that of the owls by Green.

12. Description of two new genera of Soft Shell Turtles of North America.—By C. S. Rafinesque.

APALONE and MESODECA.

The following account was prepared for the Philosopical Society of N. York in October 1816; but not published at the time. It is now given as written 16 years ago.

The Zoologists had preserved the Genus *Testudo* of Linneus, till Dumeril in 1806 established the G. *Chelonias* for the Sea turtles with feet like fins, the G. *Chelys* for the T. *matamata*, and the G. *Emys* for all the turtles with 5 moveable palmated toes. Lately the G. *Trionyx* has been proposed by Geoffory for the soft shell turtles with 3 toes and claws. But last year I proposed in my analysis of Nature (Palermo 1815) to divide the Turtles into 15. G. as they offer so many other important Characters.

They were 1 *Chelonias* D. 2 *Testudo* D. 3. *Gopherus*, Raf. With flat round nails. Type. T. *polyphemus* of North America.

4. *Chelonura*, Raf. with long tails 5 & 4 claws. the bills serrated. Type T. *indica*, many Sp. here blended.

5. *Chelyra*, Raf. Soft shell Sea turtles with sulcated back. Type T. *coriacea*.

6. *Trionyx* of G.

7. *Heliphus*, Raf. Water turtles with Valved shells 5 claws and toes to all the feet.

8. *Uronyx*, Raf. an anterior valve to the shell, toes and claws 5 and 4, tail with a claw. T. Scorpioides, &c.

9. *Didicla*. Raf. Bivalve lower shell, toes 5 and 4. Type T. *clausa, odorata*, &c.

10. *Monoclida*, Raf. Lower shell valvular anteriorly, toes 5 & 4. T. *retziana* &c.

11. *Emyda*, Raf. or *Emys* D.

12. *Chelyda*, Raf. or Chelys D.

13. *Chemelys*, Raf. Warty Scales, no valves 4 toes to all the feet. T. verrucosa &c.

14. *Chelopus* Raf. No valve, toes not palmated 4 and 5. T. *Punctata* &c.

15. *Cheliurus*, Raf. No valves, feet palmated a long scaly tail. T. Serpentina &c.

This year I have discovered in my journey to the falls of the Hudson and to Lake Champlain, a new Soft Shell turtle which has 5 toes instead of three as *Trionyx*, and which I propose to call *Apalone*. Bartram has long ago described and figured another Soft shell turtle with 5 claws, which has been commonly blended with the T. *ferox*, this must form also another Genus *Mesodeca* by having 10 Scales in the middle of the back.

1 N. G. *Apalone* Raf.

The name is contracted from *Apalochelone* meaning Soft turtle.

Char. G. Body and limbs soft without scales. Nose proboscidal, jaws without a bill. Upper Shell smooth soft with a small keel anteriorly. Lower Shell anterior, body denudated behind. Five palmated toes to all the feet, with small claws. Tail short corrugated.

*Apalone Hudsonica*, Raf. Upper shell rounded elliptical, flat, entire, yellowish with brown spots, and a circular black line near the margin. Two oblong occulated spots before and behind the eyes. tail obtuse mucronate shorter than the shell.

A very pretty small species from 2 to 6 inches long, found in the River Hudson between the falls of Hadley, Glen and Baker, and further up to the source. It is called mud turtle and not eaten. It is a lively pretty animal,' quite harmless, as it cannot bite, having no horny hard jaws. It dwells in the mud and sand, and buries itself under it in winter. It feeds on small shells and fishes.

Body olivaceous striped and dotted with brown; but entirely smooth without warts. Neck retractible and elongated when extended, grayish clouded with rufous as well as the feet. Head small with 2 singular large spots one before and one behind each eye, oblong yellow with a black margin, appearing like as many eyes; while the true eyes between them are small round with a yellow iris. Nose tubular like a proboscis extending beyond the mouth, and truncated with 2 round nostrils. Mouth large, with thin soft lips. The hind part of the body is denudated beneath, the lower shell extending only half way from before and is blueish white. Vent round, tail conical short thick rugose obtuse mucronate. Feet spotted, toes black, 5 unequal with small claws. The upper shell is very entire and prettily spotted, the margin is yellowish unspotted, then comes a circular black line blackish but spotted of brown, while the centre is olivaceous yellow with many round spots occulated and clouded by having a brown margin, with grey dots within. The small half keel extends only to the middle or as far as the lower shell below.

II. N. G. MESODECA Raf.

The name means *middle* with *ten* Scales.

G. Ch. Body and limbs soft upper shell soft but with 10 hard scales in the middle, and 10 pair of hard lateral ribs,

with many horny warts before and behind. Lower shell hard and horny in the middle. Head with lateral compartments above and lateral contractible warts. Nose proboscidal. Mouth with horny jaws. Five palmated toes to all the feet with crooked claws.

*Mesodeca bartrami*, Raf. Upper shell elliptical entire brown unspotted. Head long, neck rugose, warty.

*Synonyms.* Great Soft shell Tortoise Bartram's travels in Florida (Philadelphia 1791) page 177 to 179 fig. 4 and 5.

*Testudo ferox* of many authors but several species have been blended by them, found in Carolina, Alabama, and Louisiana, while Bartram says he found this only in East Florida. The T. *ferox* had been described and figured by many authors; but their figures and descriptions must be compared and revised. When not copied from Bartram they apply to other species or the true T. *ferox* of L. first figured in Phil. Trans. vol. 6. fig. 10. See also Lacepede, vol. 1. tab. 5. and Schoepf. turtles, tab. 19.

This turtle of Bartram cannot more be the T. *ferox* which is a true *Trionyx*, than the *Apalone*! For the complete description and history of this species see Bartram's page and fig. quoted. It is one of the most explicit descriptions of his book, and the 2 figures of the body and head are no doubt correct. It is a large sp. 2½ feet long and weighing from 30 to 40 lb. excellent to eat. Although carnivorous it is no more ferocious than all the other turtles and terrapins feeding on prey.

*New-York, October*, 1816.

## 13. Geology and Oryctology.

*Extracts of a Series of Geological Letters to Prof.* Al. Brongniart, *President of the Geological Society of Paris; by Prof.* C. S. Rafinesque.

First Letter, March 1832.

There are now 4 schools or Systems of Geology in the U. States. 1. The old school to which Maclure, Mitchell, James, Troost, Nuttal, Schoolcraft, &c. belong. This is properly an American branch of the Wernerian school. They neglect fossil remains and merely depend upon the position of rocks.

2. The Northern school of which Prof. Eaton and Silliman are the founders: it has many followers in the Northern States. It is based upon the series of formations from Boston to Lake Erie. It neglects fossils also, and lacks the solid foundation of Oryctology. It surmises that all the rocks of the U. States must agree with those of the North, without being able to prove it, since Eaton who has laid out the series of rocks, has never seen those of the South and West. He leans to the Plutonic theory.

3d. The English school believes that the whole world is to be found in England, and that our strata and formations must agree of course with those of England. Prof. Featherstonaugh, who has given lectures on this System of Geology, and now publishes a Journal of Geology is very sanguine and active on that opinion. He has many followers, who all incline to the Huttonian theory. They know that Oryctology is as needful to Geology, as Chronology is to History; but have hardly began yet to examine our fossils in sites.

4th. The fourth school is my own, I call it the *Natural and Oryctological Method of American Geology.* I began to teach it in my public lectures in Lexington in 1819 and 1820. Mr. Clifford and others had adopted it. I have not published much upon it yet; I was apprehensive of hurting the ideas of the systematic writers. But after 30 years of observations and reflections I think that I can boldly venture to compete with them for what I have seen and studied, while they have not. My theory is not a system; but the result of what I have seen in the South of Europe, Sicily, the Azores and this Continent: nor do I mean to apply it to the whole world, as I deem that every region has peculiar local features. I take besides whatever is good in every previous theory.

I propose to divide the formations as follow, in 3 series and 10 groups; each with many formations.

1. Series.—Inorganic formations.
   1 gr. Uniform formations.
   2 gr. Compound formations.
   3 gr. Volcanic formations, including the Basaltic and Trapic.

II. Series.—Organic formations.
4 gr. Primary or Vetustal.
5 gr. Secondary or Planial.
6 gr. Tertiary or Alluvial.

My primary organic formation answers to the transition of Werner, the secondary to his floetz rocks, and the tertiary to the deposited alluvions, diluvions, &c. which I divide into diluvial, fluvial, pluvial and litoral.

III. Series.—Anomalous formations.
7 gr. Vegetable formations.
8 gr. Animal formations.
9 gr. Human formations.
10 gr. Atmospheric formations.

I am prepared to support and demonstrate this natural theory, by physical, oryctological and ocular proofs. I have taken, as it were, nature *sur le fait* in Sicily and America. I have seen the various anomalous formations forming. I have discovered the craters or mouths of the eruptive salses or pseudo volcanoes, calcareous, slaty and carbonic, to which are due all the organic formations. When not visible, they are covered or obliterated like those of basalt and many volcanic strata.

This leads me to explain my views on this series. I deem all these organic strata of the second series, formed by emanations or salsic eruptions of oceanic SALSES or submarine pseudo-volcanoes, except the modern alluvions; but many ancient alluvions may also be owing to watery salses or eruptions of water. Baron Humboldt has surmised that the Asiatic flood was caused by an eruption of the Caspian sea. Our American lakes may have caused floods with us, and Volney deemed Lake Ontario such an aquatic volcano.

These volcanos were not ignivomous like those of the first period or series, but salsivomous; they were under the sea in the primary and secondary formations; but on dry land in the tertiary. They ejected by turns and alternate paroxysms the mud or slimes which have formed the organic strata; either calcareous, slaty, argilaceous, carbonic, gritty, sandy, &c. which are found to alternate, and spreading horizontally they overwhelmed and imbedded the marine fossils which we find in them.

I do not know if this theory has any followers in Europe; I presume not, since Patrin who had partly forseen it, has not been believed. It is with the utmost astonishment that many hear of it here, yet it explains every thing without the least difficulty, while all the geologists are puzzled with the intermixture of strata and fossils. And above all the carbonic formations, so vainly attempted to be reduced to a plausible theory.

We have in North America 3 kinds of coal, or carbonic formations: 1. Anthracite. 2. Bitumite. 3. Lignite. This last only is of vegetable origin, and belongs to the alluvial or tertiary group, being mixed with the alluvial clay of our great streams. The anthracite is chiefly found on the Eastern slope and borders of the Alleghany mts. among the shales and grits, while the bitumites or bituminous coal is much more common on the summit and eastern slopes of the Alleghany mountains, among the slates and limes. They are both evidently of eruptive origin like the strata which are above and below them. There is no need to suppose a multitude of physical revolutions, successive floods and cataclysms to form them out of vegetable ruins. All is easily explained by alternate emanations or eruptions, with the other organic formations. Has it ever been calculated what would have been required to form our carbonic strata out of lignose fragments; forests covering the whole earth, (which was not then quite dry land,) with trees as thick as the grass of a meadow, would hardly be sufficient for a single stratum. And we have many such over each other, separated by thick strata of schist, grit and lime. The vegetable fossils found in them, most of which are marine, have been imbedded there, as they have in the

grit (and like animal fossils in limy and sandy shale) by carbonic eruptions of litoral and marine salse.

Note.—I am glad to add that Mr. Hembel and perhaps many others reject the absurd vegetable theory of coal.

I send you figures and descriptions of 7 of our fossil plants for the Geological Society.

1. *Rytoma equalis*, Raf. disc. 1821 in Kentucky in the Wasioto hills, and the carbonic region. It is an impression on clay-stone, reddish brown. It is near to *Calamites*, but flat, not cylindrical, although neither distorted nor flattened. *Gen. car.* Straight, flat, long, cut at equal distances by transversal furrows, others smaller longitudinal approximated, separated by flat ribs. *Spec. car.* Furrows deep and narrow, the transversal larger, the ribs larger than the longitudinal furrows. (3 inches.)

2. An unknown *Lignite (L. Cliffordi)* from the carbonic regions of Kentucky, disc. 1822. Superincumbent to coal in the grit. Resembling the *Phytolites dawsoni* of Steinhauer. Petrified in sandstone grit. Brown outside, grey inside, impressions on both sides, fibres flat parallel unequal in length, equal in breadth, strias between very small, interior obliterated, yet a little porose.

3. *Mesiphites clavata*, Raf. A singular fossil of the diluvium of Philadelphia in iron clay. Is it a plant near to the fistular Fucus, or an animal near to *Holothuria?* Mr. Peter A. Browne has figured several of these fossils, perhaps different sp. in the Journal of Geology. I shall publish them again with his figures and my names. Are the singular fossils lately discovered in the ferruginous diluvium of Nova Scotia, similar to these?

4. *Cladocerus alcides*, Raf. 1818. Fossil resembling the horn of an elk, but rather a plant, disc. 1818 in the calcareous shale of Kentucky. It is very near to my N. G. *Somarites* (enum. sp. 73) which I placed among the Alcyonites; but which is perhaps a plant also, (or a porostome) differing from this merely by having no outward tegument. Gen. Car. Irregular, compressed, palmate, subranose, twisted; interior a little fibrose. Exterior with a tegument covered by flexuose longitudinal furrows. *sp. car.* Difforme, oboval, obliqual, palmate, truncate or split, one side angular, the other thick, furrows unequal curved or flexuose often twisted. 2 or 3 inches.

5. *Trispinites obliqua*, Raf. 1818. Very singular fossil, resembling an *Eschara*, but apparently a plant, without any cell or mouth. From Clifford's museum, discovered by him in the sandy grit covering the coal on New River in West Virginia. *Gen. Car.* Surface flat tesselated, each square with an oblique heart shaped impression, and 3 prominent spines behind. *Sp. Car.* Angular or squared, 3 or 4 tesselated squares on one inch. Size 4 to 6 inches.

6. *Porimites levigata*, Raf. 1818. Nearly smooth, pores round.

7. *Porimites sulcata*, Raf. Deeply sulcated, pores oblong or elliptical.

These two splendid fossils, were discovered by Mr. Clifford in the sandy grit of the Cumberland and Clinch mountains in Tennessee. The fragments were a foot long, and 6 inches in diameter, cylindrical, very hard, nearly silicified and brown. Is it a fossil plant near the *Cactus* or animals near the Millepores? *Generic Car.* Body cylindrical, solid, no tegument, covered outside with longitudinal wrinkles, and regular rows of pores, alternating; each with a mamillar centre.

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## 14. *Remarks on the Silicious Fossils of North America.*

[Translated from the French.]

By C. S. Rafinesque.

The Essay of Brongniart on the silicious orbicules has begun to unfold some important geological facts. As I can add some others to those indicated by him, I will venture some remarks on the silicious fossils of the great central basin of N.

America. This immense basin extends from Canada to the Gulf of Mexico, and from the Alleghany to the Ozark mountains which are gritty mountains, while the basin itself is of very ancient limestone, altho' quite horizontal, but often covered with hills of slate, coal and sandstone.

Prof. Brongniart has mentioned some of the fossils which I sent him in 1820 from this region, (*Terebratula, Shophomenes, Favosites*) which had on them silicious orbicules. I could add many more as I have seen several others on *Turbinolites, Orthoceratites*, &c. My *Cyclorites turbinolia* covers all over one of the first. I consider it like all my cyclorites of the S. G. cyclepite as parasite animals become fossils along with their support. Among my G. *Cyclorites* published 1819, and a complete monography in 1831, there are some flat and fixed, others fixed branched, free and simple with 1, 2 or several orders of circles. While in my G. Fibrillites, the whole is striated in the interior as in the *Tethya* of Donati and my G. *Bolactites*.

Yet I do not doubt of the globular and circular cristalization of the silex. Far from it, I have always believed in it for 30 years past, even when hardly any mineralogist could believe it. Besides the mamillar and oculated calcedonies and agats, I have seen jasper, onyx, cornelian, quartz, and chert, &c. with cristals either mamillary or hemispherical or lenticular. I have several specimens in my cabinet, such as red jasper, blue and white onyx, &c. I should therefore be inclined to believe that some of the orbicules mentioned or figured by Brongniart are orbicular cristals; but there are some, which with my cyclorites, fibrillites and others omitted, have the appearance of being animal fossils of ancient pelagic alcyonites, become silicious, like nearly all the fossils of the ancient limestone of Kentucky, Ohio, Tennessee, &c.

It appears that the geologists do not yet know well this fine region of fossils whose oryctology was first explored by Clifford in 1814 to 1820, and next by myself in 1818 to 1826. Maclure has designated all the region west of the Alleghanies as secondary, and James calls the same transition. Brongniart appears undecided whether it is transition. In fact it is neither strictly the one nor the other! America is not always similar to Europe in all the formations and strata. It has neither chalk nor lias? The Oolites and clays are often out of place! The ancient or pelagic limestone of this region as well as the slates and grits which surmount them are of transition by their appearance and ancient tribes of fossils; but they are similar to the secondary of Europe, by the horizontal position of the strata, and the silicified fossils like those of the chalk. They form therefore a kind of peculiar series, deserving perhaps a peculiar name, since the English appellation of mountain limestone or carboniferous limestone do not properly apply; they do not form mountains, but inferior horizontal strata, and do but seldom bear the coal. I have called it compact when it is nearly homogeneous and *specular* when it has a shining lamular fracture, &c. The fossils are disseminated in it very unequally, being sometimes very rare, but accumulated in some localities. Some species are very abundant and others very rare. Their great antiquity is proved by the ancient tribes to which they chiefly belong, Madrepores, Milleperes, Turbinolites, Favosites, Terebratulites, Encrinites, Alcyonites, &c. with some Trilobites and Cephalopodes.

But the most striking fact consists in the complete silicification of all these fossils of nearly 1000 different species. Most of them are casts of destroyed animals replaced by a silicious matter. This is constant in the limestone, except in the newest and uppermost, the shaly

limestone, which covers the oldest in some places, or elsewhere is under the sandstone or slates. The same happens in the long but narrow formation of limestone called transition, which borders on the mts. Alleghany to the East dividing them from the primitive hills. The Trilobites and Terebratulites, &c. are there also silicified. While in the limestones of New-York N. of the Alleghany, or superposed to the E. of them, the fossils are nearly all calcareous. And in the vast marl region from Long Island to Florida along the sea, all the fossils are calcareous or marly. A few later fossils of Kentucky, &c. not silicified, are chiefly found in marly formations.

The fossils of this central region can therefore be known at first sight when seen silicified in limestone. Thus the cyclorytes and silicified alcyonites may well be animals likewise. This becomes very clear when many of them are seen, which approximate to living animals of the Tropical seas and Mediterranean.

As a striking instance I add the descriptions (and figures in the original) of 2 N. G. of mine from the sea of Sicily.

1. *Psadiroma rubra*, Raf. Analyse Nat. 1815. Family of Polactomes—Animal fixt upon shells, fleshy red, smooth, elliptic, flattened, margin irregular, many flexuose concentric strias, centre with an expansible mouth without tentacula.

2. *Peritrema lobularis*, Raf. disc. 1807. Family of Alcyons.—Fixed on rocks, lobed, compressed, fleshy, brownish, with many rings on the surface, having a hole or pore in the centre.

These two animals appear to represent the ancient cyclorytes of the pelagic world; but many more exist yet in the seas.

It will therefore be needful to distinguish with care among the silicious fossils with simple forms, those which are really inorganic, such as the orbicules, spirozoites, annulites, globulites, mamillites, lentikites, &c. and the organic fossils; such as the fibrillites, cyclorytes, bolactites, granulites, &c. which may resemble them, and also the geodes from the geodites. If the silicious orbicules, &c. were always minerals, they should not be so rare, but common as the cristals inside of silicified shells. Out of thousands of silicious fossils which I have examined, I have only found cyclorites upon a small number. I have hardly ever seen any spiral epizoites and very seldom nodulose orbicules. But I have seen some radiated, and others with small circles within larger ones. The variety is great. If the free cyclorites were only orbicules they should not be so rare. Some are totally changed in calcedony, they should then be deemed circular calcedonies; but they are very different from the mamillar, and occulated calcedonies. Yet I was right to say that the fossil alcyonites form as it were, a link between animals and minerals, as they approximate in shapes; but my fibrillites (decidedly organised animals) proves the animality of many others gradually linked by the forms. C.S.R.

*Philadelphia, 2d April*, 1832.

Note.—The tendency to silification of all animal substances is so very great in the western strata, that even parts of bones and horns of quadrupeds have been found partly silicified outside. I have in my cabinet a remarkable instance of it in the fossil horn of my *Mazama salinaria*, which is intact inside, but partly silicious outside: although this fragment was in a late formation, not in a stratum, and belongs to the latest age of fossil animals.

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15. *Remarks on the Geodes and Geodites.*

Every hollow mineral with cristals inside has often been called Geode. Patrin, ever since 1803 in the article Geode of the Dict. of Nat. Hist. has very well distinguished the volcanic Geodes, from the Geodes of the chalk, which last he deemed fossil animals.

Our ancient limestone agrees also with the chalk by having similar geodes; but there are two very different kinds of Geodes in our ancient limestone. Some like those of the Niagara lime stone,

which Eaton has called *Geodic limestone*, contains great many cavities similar to the volcanic Geodes and filled with cristals, while in Ohio, Kentucky &c. and chiefly in the Wasioto or knobhills, the cherty limestone and even the sandstone above it, contain many *free geodes* perfectly silicified like the other fossils, filled inside with fine cristals of quartz. These geodes which I have called geodites in my enumeration, appear to me to be fossil animals, like those of the chalk distinguished by Patrin. They are always thick, often smooth, without cyclorites or orbiculites. Some are very large, I could have collected many, but they were too heavy to carry. They are often found abundantly in the ravines, glens, and torrents of the hills, mixed with rolled stones. I have seen some calcedonised. It is sometimes needful to break them to ascertain their geodic nature, as the outward appearance is delusive.

But if they were animals, as they have no visible mouths, they must have been *porostomes* become fossils. See my letter to Cuvier upon the porostomes.

They will always be easily distinguished from the chert and silicious fragments of jasper, quartz, &c. imbedded in the cherty limestone by not being in any way angular, nor ringed.

Many kinds or species can be distinguished among them, but they often run into each other by gradual forms or colors. The G. *levigata* of my enumeration, sp. 74, would probably include many such. The colors are variable, but chiefly uniform in each specimen, the whitish, yellow and rufous are most common, but various shades of red and brown are also found. The sizes vary from that of an orange to the size of a man's head, weight from 1 to 25 pounds.

The following kinds offer the most striking forms.

1. *Geodites levigata*, Raf. Commonly a little elliptical, not compressed, nearly smooth.

2. G. *Compressa*. Elliptical, compressed one side smoother than the other.

3. G. *Sulcata*. A little elliptical, with some furrows or wrinkles unequal and irregular.

4. G. *Globosa*. Globular, smaller than the others, a little rough.

5. G. *Phaiops*. Oblong, nearly smooth, dark brown.

6. G. *Ovoidea*. Ovoidal smooth, one end smaller.

7. G. *Mamila*. Elliptical, somewhat mamillar outside.

8. G. *Erythrea*. Red, oblong, smooth.

9. G. *Divisa*. Oblong, with a partition in the cavity inside.

10 G. *Biloba*. Oblong, bilobe, with two rounded parts nearly equal.

11. G. *Lobata*. With many unequal irregular lobes.

12. G. *Elongata*. Long oblong, nearly cylindrical, smooth.

13. G. *Cavernosa*. Irregular with several cavities.

14. G. *Amorpha*. Amorphous, unshapely, a single cavity.

15. G. *Dispar*. Oblong, with a large chink on one side.

16. G. *Turbinata*. Nearly turbinate, rough, one end attenuate, the other convex depressed, cavity small. Very singular sp. fulvous uneven outside, inside changed in white quartz, cavity within with mamillar crystals.

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16. *On the Cavulites and Antrosites.*

My N.G. Cavulites follows the geodites in my enumeration. It differs chiefly by having outward cavities or openings to the internal cavities. The cavulites which contain as many sp. as the geodites, are not therefore *porostomes*, but may be true alcyonites or spongites having mouths or openings to the internal stomach or cavity.

Another N. G. of mine, which I call *Antrosites*, forms the link between them. It has no outward cavities, but a single large opening or hole communicating with the internal cavity. A living sea G. of Sicily called by me *Megastoma* in 1814 comes very near to this, but here the opening is still larger and the body is fixed not free. This *Megastoma* is however a very singular animal. It is called *cedru di mari* or sea citron in Sicily, resembling outside a large citron rough or somewhat mamillar, inside quite smooth, substance thick cartilaginous. Fixed on rocks nearly inert, yet alive, since when cut it appears to shrink from the knife.

The cavulites and antrosites have many species, of as many colors as the geodites; but their size is always smaller, and they are more rare, some sp. very much so. I shall give here a few of them: but figures should be required to make them well known; they will be figured hereafter.

1. G. *Cavulites.*

1. C. *ambloides*. Subglobose, outward cavities small and unequal, few inside and small.

2. C. *anastoma*. Oblong, cavities almost anastomosed, large cavities inside.

3. C. *geodica*. Ovoidal, large cavities outside, only one inside, hardly communicating.

4. C. *unica*. Elliptical, a single cavity inside, few outside unequal, one united to the interior.

5. C. *vermicularis*. Unshapely, with vermicular cavities outside and inside.

6. C. *amorpha*. Unshapely, cavities rounded unequal.

7. C. *equalis*. Subglobose, cavities nearly equal, few inside.

8. C. *depressa*. Elliptical compressed, cavities unequal, only one or two inside.

2. G. *Antrosites*.

1. A. *globosa*. Globular, surface nearly smooth; small opening, large cavity.

2 A. *elliptica*. Elliptical, surface a little rough, opening at one end, large cavity.

3. A. *camerata*. Ellipsoidal, surface nearly smooth, opening lateral, cavity divided by partitions.

4. A. *depressa*, Ellipsoidal, depressed, nearly smooth, opening very small terminal.

5. A. *nodosa*. Rounded surface, knobby or mamillar, opening small, cavity irregular.

6. A. *magna*. Amorphous rough, uneven, opening large, cavity lobular.

7. A. *diapherica*. Formed by two united lobes rounded, nearly smooth, opening irregular.

8. A. *rimosa*. Ovoidal with many chinks, opening and cavity large.

9. A. *incurva*. Oblong curved irregular, opening terminal, cavity small.

10. A. *ditrema*. Oblong nearly smooth, two unequal openings, one at each end, cavity large. This last ought perhaps to form a peculiar genus, by having two openings, and be called *Ditremites levis*.

All these animals or fossils are entirely silicious like the geodites. The *antrosites* have often cristals inside, but the *cavulites* very seldom. They are from the same locality and chiefly from East Kentucky.

17. *On the Genera of fossil* TRILOBITES *or* GLOMERITES *of North America*. BY C. S. RAFINESQUE.

Philadelphia, May, 1832.

Prof. Green of Philadelphia, is engaged in the investigation of all the Trilobites of the U. States; a labor very much wanted; as these interesting fossils are very numerous with us, and but few as yet properly named and described. Instead of figures he will give colored casts in plaster of all those he can procure. This improvement is novel here and will be very acceptable to the pryctologists. He has already issued in April a first series of 8 casts and species accompanied with a synoptical table, among which N.G. *dipleura* and 4 new species of G. *asaphus* and *calymene*. He has omitted the geological localities, but will probably supply this deficiency in his monograph.

I was among the first to attend to the trilobites in N. America. In 1817 Dr. Schæffer presented the first specimen from the Catskill mts. to the Lyceum of New-York, as a fossil quite unknown. I pronounced it a new genus of fossil entomostraceous crab, and called it *Glomerites eurycephala* in a paper read before the Lyceum; being very near to the G. *glomeris* of Latreille or *armadillo* of Cuvier.

Soon after I found in the work of Parkinson, that he had been the first to notice these fossils, under the name of *Trilobites*, a very good and precious name.

Brongniart in his excellent work on the trilobites, published in 1822, but which he claims to have read before a society in 1815; divides them into 5 genera, and abolishes without just cause the name of trilobites; which ought to have been left to the group *calymene*: and must yet be restored, because there is a previous G. *calymenia* of Ruiz and Pavon in botany.

Much discussion and controversy has taken place on the subject of these animals, some deeming them shells near to *chiton*; but the presence of eyes in many of them fixes them among the crabs; altho' their feet being small and soft, have been obliterated in the fossilization.

In 1821, I sent to Europe the description of 12 American trilobites, and I published in Kentucky the N. G *Iso ctomesa*.

In 1824 Dr. Kay produced it again under the name of *isoteles* and in 1826 Dolman calls it *nileus*.

Dolman has described many European species; we have nearly as many in North America, offering

many striking generic distinctions. As far as I know them they must form at least 15 genera, and 4 series of beings, with many, two, one or no eyes.

I. Series or Section. More than two eyes. POLYOPSITES.

1. G. ALLOCTOPS, Raf. 1821. Trilobate not glomerate, head with 8 unequal eyes in 2 longitudinal rows. Thorax and abdomen with many segments. 1. A. *flexuola*, Raf. about 20 flexuose segments, fore eyes smaller, tail a little jutting obtuse. Cabinet of Transyl. University, from old limestone of Kentucky.

2. G. DIPLOPSITES, Raf. 1821. Not trilobate nor glomerate, head with 4 eyes double on each side. Thorax and abdomen with many segments, 1. D. *levis*. Very smooth, eyes equal. An imperfect specimen in the Cincinnati Museum, from Ohio.

3. G. TOMOLIGUS, Raf. 1821. Not trilobate but glomerate, head very broad, 2 large eyes cut in two lengthways. Thorax with few segments, 4 or 5, abdomen large entire, Type. 1. T. *mimulus*, 1821, (or my *trilobites simia*, enum. 1831.) Smooth 2 furrows before each eye. Cabinet of Clifford, found in Salt River Knobs.

II. Series or Sections. With two eyes.—DIOPSITES, Raf.

4. G. ISOCTOMESA, Raf. 1821. *Isoteles*, De Kay, 1824. *Nileus*, Dolman, 1826. Not trilobate nor glomerate. Head and abdomen large entire, 2 distant eyes. Thorax with 8 equal segments. Type 1. T. *emarginata*. Eyes round, abdomen larger than the head, retuse or notched behind. Cabinet of Trans. University, presented by Judge Bledsoe, found near Harrod's Lick and Paris in Kentucky, in old limestone. The largest trilobite known, being 9 inches long and 4 broad. Different from the I. *gigas* of De Kay, which has bilobed eyes and is not notched. I. *plana*. D. and other sp. belong to this genus also. The G. *Ilenus* of Dolman, hardly differs having only 9 or 10 segments to thorax. It may form a sub-genus

5. G. DIPLEURA, Green, 1832. Not trilobate, subglomerate, 2 oblique eyes, thorax with 14 segments, abdomen or tail orbicular. See Green's series No. 3.

6. G. ASAPHUS, Br. 1822. Trilobate, not glomerate. Abdomen or tail expanded large, without segments. Thorax with many segments. Many sp. see Brongniart and Green.

7. G. TRILOBITES. Park. 1812. *Glomerites*, Raf. 1817. *Calymene*. Br. 1822, and Green, 1832. If the name trilobites is not to be generic, *calymene* must be changed nevertheless for *diopsites* or *geoplaxis*, Raf. many sp. I descr. 2 in my enum. T. *eurycephala* and T. *granulata*. Green has 5 sp. in I. series, of which 3 new; but his pretty C. *calicephala* ought to form a sub-genus *Orimops*, Raf. by eyes annular or with a central dot, and head with a curious relief like a flower de Luce. The G. differs chiefly from *asaphus* by having the abdomen with segments or blended with thorax, and both glomerate.

8. G. TELESIOPS, Raf. 1832. Differs from the last, by head very broad, with remote lateral eyes, very large, prominent and reticulated. 1. Type. T. *leiocephas*, Raf. Head smooth, eyes reticulated by dots, flat and smooth above, thorax with 11 segments, lateral ribs duplicate, abdomen or tail with 7 segments flattened not duplicate. My cabinet, from Virginia, several sp. blended under C. *macrophthalma* of Br. must be united here, and probably also my T. *eurycephala* or *Telesiops granulata*. The T. *leiocephas* I have ceded to Prof. Green.

9. G. PROMENITES, Raf. 1832. Bilobites, Raf. 1821 and 1831, in enum. I have changed the name as there are several G. bilobites. 1. Pr. *lunula* Raf. 2. Pr. *bilobata*, &c.

10. G. OGYGIA, Brongniart.

III. Section or Series. Only one eye? MONOPSITES, Raf.

11. G. METAPTELES, Green; or MONOPSITES, Gr. or CRYPTOLITES, Gr. All these names proposed by

Green; he shall select probably the best. Singular G. without eyes? but with a big central knob like an eye, only the head known, trilobate, with a fine reticulated forehead. 2 sp. see Green's work.

IV. Section or Series. No eyes. ANOPSITES, Raf.

12. AGNOSTES, Br. 1822. *Batus*, D. 1826.

13. PARADOXIDES, Br. 1822. *Olenus*, D. 1826.

14. AMPYX, Dolman, 1826. Thorax with few segments, abdomen or tail expanded.

15. RETUSITES, Raf. 1821. Head retuse or bilobe, body trilobate with many segments, abd. not expanded. 1. Type. R. *levis*: Head short subbilobe, about 20 segments, middle lobe narrow. In Ohio.

It will be noticed that I have called head, thorax and abdomen, what others call clypeus, abdomen and tail: my view has more conformity with the living genera, and whatever bear eyes must be a head.

18. *On the Salses of Europe and America.*

Spallanzani gave the name of salses to the mud volcanoes of Italy, which commonly throw out salt water at the same time. This name has been properly applied as a generic name to all the volcanoes which throw mud, slime, clay, marl, lime, sand, &c. instead of lava, stones, gravel, pumice, cinders, obsidian, &c.

Water, air, gases, fumes, sulphur, iron and many other substances, are common to all the volcanoes, of which there are at least 4 series. Earthquakes, heat and fire, are more or less common to all in some of their paroxysms. And all the volcanoes exist within two peculiar fluids, air or water. The Aerial volcanoes or salses are those acting in the atmosphere, the aquatic volcanoes those existing under the water of the sea.

The 4 series of volcanoes are,

1. Trachytic or lavic volcanoes: such as Etna, Vesuvius, both aquatic and aerial.

2. Basaltic volcanoes, ejecting basalts and traps commonly aquatic.

3. Carbonic volcanoes, ejecting coal and slates; always aquatic.

4. Salsic volcanoes or salses. These are both aquatic and aerial. Many are yet existing; but they were much more numerous in ancient times, when the sea covered most of the land.

They are found all over the world, but those of Asia, Africa and Polynesia are little known as yet. Those of Europe have only been observed within 50 years, and those of North America by myself within 16 years.

The principal salses of Europe are now

1. Those of Italy, in Modena, the Apennines, and Roman States.

2. Those of Sicily; *Macaluba* visited by Dolomieu and myself is the most famous, as having sometimes firy eruptions, although ejecting only clay. But there are many more in Sicily ejecting clay, sulphur, magnesian marl, &c.

3. Those of Crimea, described by Pallas.

4. Those of Poland, producing mud and salt.

5. Those of Iceland, called Geysers or spouting springs, producing many earths and even silex.

6. Those of Murcia in Spain, near Orihuela. Quite lately sprung in 1829, with dreadful earthquakes, but no fire. A square of 64 miles circuit was desolated and all the villages destroyed. The ground was filled with clefts and millions of small craters, throwing out sand, black liquid mud and sea water, mixt with sea shells! and sea weeds! (see the Descr. in Bulletin of Geography of Paris.) This great eruption of our times is a complete proof of the volcanic formation of many tertiary strata and even sandstone strata, or strata with organised fossils.

Two other recent instances of volcanic eruptions of mud and earths, will be given as additional proofs.

In 1822. The mountain Galungun, near Cheribon, in Java, had a dreadful eruption with explosions, earthquakes and lightnings; but no fire, no flame and no lava. It rained ashes and hot mud, with earth and stones, which formed a stratum 70 feet deep, 20 miles long and 10 wide, overwhelming 114 villages, and destroying 4000 men.

In 1831 and 1832, some of the volcanoes East of the Andes must have had earthy or muddy eruptions, since the earth, dust, and mud, was carried easterly 1000 miles to Buenos Ayres, in black clouds, by the winds, as was stated in the periodicals, unless we admit that it was formed in the clouds.

These salsic and muddy volcanoes in fact exist every where; but have periodical or remote eruptions. When they are small, they pass unnoticed, as many have which exist in England, France and Germany; being mistaken for curious springs or casual phenomena. But these small local effects and formations are exactly what geology seeks as remains of former more powerful agents.

I have sought for them in North America and had no difficulty to find them. They exist every where in the secondary and tertiary regions. Many belong to remote aquatic formations and eruptions; but several exist in actual activity as aerial salses, with craters, throwing many earthy and saline substances.

Out of 100 interesting localities of this kind, which I have visited, I shall here mention a few.

1. SALSES of New-York, at Saratoga, Saline, Syracuse, Montezuma, &c.

2. Those of the great lime valley extending from New-York to Virginia east of the Alleghany.

3. Those of the Alleghany mts. Catskill, &c. with very ancient craters that threw sand or psamite formations, sometimes become lakes.

4. Those of Cumberland and Wasioto mts. of Virginia, Kentucky and Tennessee. The hollow mountain is a singular psamite crater in it very ancient.

5. Those of the Ohio basin, in Ohio, Kentucky, Tennessee, Illinois, Indiana. Very numerous and various, of different ages and periods, called licks, salines, springs, &c. Such are Bignob licks, Harman licks; mud licks, yellow springs, &c. which will be described in my account of the licks.

6. Those on the Mississippi, or west of it, are very numerous also. In 1811 and 12, they had dreadful eruptions forming lakes and clefts, craters, new strata as in Murcia.

All these throw out as yet periodically, earths and salts, gases, mud, clay, iron, lime, marl, bitumen, sand, &c. and continue to increase some smaller or local formations of those substances.

The account of these salsic volcanoes will be continued in other papers; and the carbonic volcanoes of North America will be described in my memoirs on the coal mines of North America.

C. S. Rafinesque.

19. *On the* Lamellites, *N. G. of American Fossils.*—By C. S. Rafinesque.

Among several fine fossils of the cabinet of Prof. Green, which I have added to mine by exchanges, I have found 2 sp. of a N. G. of POROSTOMES, or animals without mouths, in a fossil state. I was right to announce that the fossil porostomites would soon increase in number

I have called this N.G. *Lamellites* owing to its internal lamellar structure, whereby it is related to my bolactites, fibrillites and the living tethya. It differs chiefly from this last by its solid centre and smoother outside, without cuticle. Both species are from the State of New-York, near Glen's falls in the old limestone of that region, somewhat similar to the transition of the long valley; but of a darker hue; nearly black with a bluish cast.

They are not silicified, but petrified, into the hard limestone, and can be scratched by iron.

G. *Lamellites.* Body free without a cuticle outside; lamellar in a radiating form around the circumference, centre solid not lamellar, but the lamellas radiate from it.

1 sp. L. *bilobata*, Raf. Oblong, nearly bilobe, or middle contracted, ends rounded. Surface a little uneven, lamellas, elongated, solid centre small. Fine large heavy and hard fossil, 4 inches long, blackish, with some roughness and pits outside, some white spots inside.

2. sp. L. *depressa*, Raf. Discoidal, depressed, nearly smooth outside, lamellas short; solid centre large. Smaller, diameter over one inch, softer and of a paler bluish cast.

The figures of these and 500 other fossils will be given in my Iconographical Illustrations.

## PHYSICAL GEOGRAPHY.

20. *Licks and Sucks of Kentucky.*

By C. S. Rafinesque.

The enumeration of these places properly belongs to Physical Geography, their ultimate history to Geology.

Their geological name is SALSE. They are found all over the Western States, and even in Western Virginia and Pennsylvania; but are most numerous in the Central State of Kentucky. They were called LICKS by the first settlers, because they noticed that buffaloes, elks and deer went *to lick* the saline ground, and SUCKS when they went to suck or drink the saline springs or pools of the salses. The French settlers called them *salines;* this name has been partly preserved in New-York, Canada, Illinois, and Missouri.

Nearly 100 licks are noticed in the large map of Kentucky by Munsell; but I have seen or heard of 60 more. They may be divided into 3 series.

1. *Salt Licks*, producing saline efflorescences or salt springs and pools. In summer the springs are often dry, but the saline particles

exist in the soil. Altho' sea salt is the most common, yet several other salts mixt with it, Epsom and Glauber salts, &c. or many sulphates and muriates. Few licks afford the pure muriate of soda.

2. *Sulphur Licks.* Those where sulphates and hydrogene predominate, rendering the soil or water fetid.

3. *Clay Licks.* Where clay or marl chiefly abounds; often partly saline, and licked by wild beasts or tame cattle. The paint licks have colored ochres.

Nay, these 3 kinds of licks are often near each other; at mud licks for instance, 4 springs, salt, sulphuric, vitriolic and chalybeate are found. But chalybeate springs are not called licks, because the cattle do not lick them.

The licks are known at first sight by their barrenness, as little grass, few plants and fewer trees, grow among them, being commonly destitute of soil, and forming therefore many small barren spots among the fertile lands of Kentucky, from 100 yards to one mile or more in extent. But few are stony; they are generally formed by a thick stratum of clay, from 3 to 100 feet high, raised in heaps, slopes, hills or hollows: perpetually washed by rain into gullies or clefts, by the unshaded heat of the sun.

To enumerate them properly, as counties are yet fluctuating in Kentucky, I have disposed them in 7 groups, according to their situation near streams.

*Enumeration of all the Licks of Kentucky.*

I. Group. Near the Ohio river.

1. Salt lick near Vanceburg and mouth of Salt Lick Creek.

2. Bank Lick near Covington and Bank Lick Creek.

3. Briarpatch Lick on Stony creek, N. of Burlington.

4. Sand Lick on creek do. opposite mouth of Miami.

5. Double Lick on Woolpers cr. & do.

6. Bigbone Lick on creek do.

7. 8. Mud Lick and Upper Lick on mud cr. near last.

9. Paint Lick on creek do. S. of 6.

10. to 12. Flat Lick, Fern Lick and Bolger's Lick, on Fern or Pond cr. S. of Louisville.

13. 14. Mann Lick and Elk Lick, S. of those in the knobs.

15. 16. Clover Lick and Tar spring Lick on Clover cr.

17. to 20. White Lick and 3 other on Highland cr.

21. Clear Lick, at fork of Clear cr. and Tradewater cr.

II. Group.—On the two Sandy Rivers.

22. 24. On branches of Big Sandy. Rummer Lick in Beaver cr. in knobs, Cats Lick and Bigpaint Lick on the cr. bearing their names.

25. 26. 27. On Little Sandy, 3 Salt Licks. Little Sandy L. Grayson L. Berret Lick. Much salt made.

III. Group.—Licks on Licking river, which took its name from them. All in the limestone region.

28. 29. On North fork, May's Lick, a salt stony lick, and Stone Lick at the head of the fork.

30. Grant Lick on Philips' cr. branch of main fork.

31 to 37. On Middle forks. Upper and lower Blue Licks, salt and stony. Cow Lick and Slate Lick on Cow cr. and Slate cr. Mud Licks or Olympian Springs, 4 springs as stated on a brook. Station Lick and Burning Spring Lick near the head.

37 to 47. Ten Licks on south fork. Fork Lick on Forklick creek.

Four Licks below Cynthiana.

Harrod's Lick on Harrod's cr. above Paris.—2 Stone Licks on Stoners fork.

Carlisle Lick, one mile W. of Carlisle on Lick cr.

Hinkston Lick on Hinkston fork.

IV. Group.—Licks on the Kentucky river and branches, beginning near the head.

48. Burning Spring at the source of Burning Spring fork of South fork.

49 to 53. Five licks near Manchester and South fork, all Salt Licks, where much salt is made. Collins Lick, Goose Lick, Outlaw Lick, Elisha Lick, Redbird Lick.

54. Estil Springs and Licks near Irvine.

55. Salt Lick near mouth of Troublesome cr.

56 to 59. Red Lick, Blue Lick, Copper Lick and Rock Lick on 4 forks of Station Camp Creek.

60 to 64. Paint L. White L. Big and Little Harman Lick, Button Lick, near Paintlick cr.

65. 66. Silver Lick and Rocky Suck on Silver cr.

67. Stone Lick S. of Frankfort.

68. Glen's Lick E. of Frankfort 1 mile.

69. Cedar Lick on Cedar cr.
70. Clay Lick on the Kentucky E. side
71. Drennon's Lick on Drennon cr. W. side.
72. 73. Deer Licks on Mill creek.
74 to 79. Near Dick River, 6 Licks. Big knob Lick the most remarkable, a fine salse of marl of late formation, nearly 2 miles round, with craters, &c. Little knob Lick at head of Knoblick cr. East Knoblick on Lick branch. Shelby Lick on Knoblick cr. Fall Lick on Fall cr. Boon's Lick between Mt. Vernon and Crab orchard has salt wells.
80 to 87. On Red River, 8 licks or more, all in the Knobs. Alum Lick and Iron L. near the iron works. Catamount. L. Red L. &c. above them.
88 to 92. Near the Elkhorn cr. Buffaloe stamping ground. Sulphur Springs. Elkhorn Lick on North Elkhorn. Lane's Licks 2 or Lane's run.
93, 94. Big Lick and Spencer Lick on Eagle cr. near each other.
V. Group.—Licks on Salt River and branches.
95. On Lick fork of Floyd cr.
96. Long Lick on Longlick cr.
97. Bullit L. on Bullit cr.
98, 99. On Simpson cr. 2 Licks.
100, 101. Dry L. and Harrod's L. near Harrodsburg.
102 to 105. Several licks or branches of Beechfork.
105 to 110. Several on Rolling fork in the knobs chiefly. Falling run L. Pine L. at head of Pottinger cr. Two sulphur L. N. and S. Salt L. on Salt run near Muldraugh hill. Cedar L. between New Lebanon and New-Market.
VI. Group.—Licks near Green River and branches. From the head to the mouth.
111. Long L. near the source, giving rise to Long branch, and also to a branch of Dick R. in the Knobs.
112, 113. Mocassin L. two near head of Green R. and Mocassin cr.
114. Pine L. on cr. same name.
115. Locust L. on Locust run of Pitman cr.
116. Rock L. on Brush cr.
117, 118. Elk L. a dripping rocky lick, and Sulphur L. both on Little Barren R.
119. Clay L. at the head of Bear cr.
120 to 122. Wolf, Duck and Elk L. on 3 forks of Muddy River.
123. Alston L. on Alston cr. branch of Pond cr.
124. Otter L. on Otter cr. branch of Pond cr.
125, 126. Long L. and Sulphur L. on two branches of Rough River.
127. Big L. on Panther cr.
128. Deer L. on N. fork of Deer cr.

The following are on the branches of Big Barren River.

129. Wolf L. on Wolffork of Gasper R.
130. Gasper L. on Gasper R.
131. Black L. on Blacklick fork of do.
132. Clay L. below Bolingreen.
133 to 135. Salt L. on Drake cr. Salt made. Sulphur L. and Trummel L. on forks of Drake cr.
136, 137. Licks on Noble cr. and Difficult cr.
139, 140. Two licks near Chaplintown and Saltpetre cr. and cave.
141 to 144. Four Licks on East fork of Big Barren River.
VII. Group.—On the waters of Cumberland River in E. Kentucky in Knob hills chiefly.
145. Hollow L. at the source of Cumberland River, near the Hollow mt. in Cumberland mts.
146. Yellow L. at head of Yellow cr. near the Cumberland Gap.
147. Morgan L. on Cumberland between mouths of Laurel and Rockcastle Rivers.
148. Flat L. on Stinking cr. E. of Barboursville.
149. Raccoon L. in Knobs at head of Richland cr.
150. Flat L. on Buck cr. to N. E. of Somerset.
151. Fighting L. at the forks of Fighting cr.
152. Rennick L. above Burksville.
153. Salt L. in Saltlick bend S. of Burksville.
154. Sulphur L. on Sulphur cr. branch of Ohio River.
155 to 160. Six Licks near Rockcastle River. Round stone L. on cr. ditto, N. of Mt. Vernon. Double L. and Horse L. on Horselick cr. Birch L. Indian L. and Laurel L. on Laurel fork of Laurel R.

Some other nameless Licks may exist in Kentucky. When very small or quite dry, they often pass unnoticed, and many Sucks are now called Springs. I have seen many such which it would be tedious to detail.

Licks become Sucks sometimes in the Winter and Spring, in rainy weather: and many Sucks become Licks in the dry season. Some mineral springs were formerly sucks, such is the Cameleon spring in the knobs near the Mammoth Cave. Deer and Cows now frequent the Licks to lick the ground.

The Spouting Springs and Burning Springs of Kentucky although

commonly connected with the licks, are but few and peculiar phenomena.

The descriptiou of the most remarkable Licks will be given hereafter in a geological Essay. Although few are alike in extent and form, they have nevertheless many things in common.

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21. *The two Highest Mountains of America.—By Pentland.*

They are both in South America and in Bolivia.

1. Mount Sorata, East of Lake Titicaca is 25,250 feet high: the highest in America; but yet lower than the peaks of the Imalaya in Asia. Peak Javaher is 26,745 and others from 27 to 28,000.

2. Mount Illimani, East of City Lapaz is 24,350 feet high, and the second highest in America: while the famed Chimborazo, once thought the highest on earth and lately the highest at least in America, is at best the third in rank, being only 21,425 feet high. Perhaps other higher yet are to be found in Bolivia and Chili.

Pentland in 1825 measured the mountains and heights of Bolivia, and found them higher than those of Quito, near the equator. The highest land of America is to the S. of it, while in Asia it is N. of it.

This discovery upsets all our boasted calculations and physical views of mountains; which must be amended as well as our geographical school books.

Another discovery of Pentland destroys the whole of Humboldt's fanciful theory of gradual limits of congelation and perpetual snow. Thus every learned theory in geology is gradually destroyed by facts.

On the Andes of Quito at the equator the perpetual snow is found only at 15,749 feet. While in the Andes of the Bolivia, between 18 and 19 S. of Equator, the perpetual snow is found only at 17,061 feet! by the theory it ought to be at less than 14,000! at which height are found villages and vegetation.

The post house of Ancomarca inhabited 4 months in the year, is at 15,722 ft. above the sea. The village of Tarura at 14,252 feet.

The city of Potosi is at 13,314 feet, the mines at 15,912.

City of Chucuito at 13,025 feet.

The Lake Titicaca inhabited all around is at 12,703 feet. The table land of Tajora W. of it 18,898.

Lapaz, the largest city of Bolivia, at 12,195.

While in Mexico at 18 to 19 d. N. of the Equator, all vegetation ceases at 14,075 feet.

The Imalaya mountains of Asia evince also that other causes besides latitude and elevation, influence the climate, heat, vegetation and congelation; since in latitude 20 to 30 N. cultivation extends as far as 17000 feet above the sea, and perpetual snow begins only at 20,500 feet, according to Dr. Gerard's observations.

TELLUS.

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22. *Scientific Explorers of North America.*

1. Mr. Lutner, a Botanist and Entomologist, from Stutgard in Germany, has travelled last year through New-York, this year in Pennsylvania, and he is now gone to explore Carolina and Georgia. He expects to be sent next year to Australia by the Botanical Society of Stuttgard.

2. Mr. Gates has explored for two years past Louisiana, Mississippi and Alabama, at the expense of several gentlemen, chiefly in New-York. He has collected for them many plants, shells, fossils, and other objects.

3. Capt. Wyeth with a company of adventurers from Cambridge in Massachusetts, sent by the Pacific Fur Company, have departed this year to explore the Oregon Country, where they are to spend five years in hunting and trading. It is said they have a Mineralogist and Zoologist among them; but their names are not given.

4. Prof. Rafinesque has been one of the earliest scientific explorers of North America. He has travelled for 20 years as a Botanist, Zoologist, Geologist, Geographer and Archeologist, from 1802 to 1804, and from 1815 to 1832, in the following States and places.

1802. Pennsylvania and New Jersey.
1803. Ditto and Alleghany mts.
1804. Delaware to Cape Henlopen, East and West Maryland, Virginia, Alleghany mts. of Pennsyl. and New Jersey.
1815. Connecticut and New-York.
1816. New-York, Lake Champlain, the 4 falls of Hudson, Vermont, &c.
1817. Mattawin mts. Catskill mts. Long Island, Connecticut, &c.
1818. Pennsylv. mts. Alleghany River Ohio to Wabash, West Kentucky, Indiana, Illinois, Ohio and Pennsylvania.
1819. Maryland, Potomack, Allegh. mts. River Ohio, Central and East Kentucky, Knobhills, &c.
1820. Central and East Kentucky.
1821. Kentucky, Ohio, Miami, &c.
1822. Central Kentucky.
1823. West Kentucky and Tennessee; East Kentucky and Cumberland mts.

1824. Central Kentucky.
1825. Ohio, Western and Northern Virginia, Maryland, Pennsylv. Kentucky, &c.
1826. Ohio, Lake Erie, Falls of Niagara, Canada, New-York from Buffaloe to New-York, Pennsylvania.
1827. New-York, Massachusetts, Boston, &c.
1828. Allegh. mts. Lehigh, Schooley mts. New Jersey and New-York.
1829. New Jersey, New-York and Connecticut.
1830. Catskill mts. New Jersey, &c.
1831. Delaware, Taconic mts. &c.

TELLUS.

## 23. BOTANY AND HORTICULTURE.

*Extracts of a letter from Dr. John Torrey of New York, to Prof. Rafinesque of Philadelphia, March* 1832.

I have lately received some of your new plants from Ohio, and also from Kentucky, sent by Mr. Eaton. Your *Cladrastis* is certainly the *Virgilia* of Michaux, it must be separated from the Exotic Virgilias, and your name (of 1825) is a very good one.

*Stylypus* has interested me very much, the stipe changes in appearance in different periods of inflorescence.

*Enemion* is distinct from *Isopyrum;* but the *I. thalictroides* of Germany may perhaps belong to it. Your *E. biternatum* I suspect to be the *Thalictrum clavellatum* of Dec. and Delessert Ic. t. 6. collected by Michaux; but without seeds; while the seeds make this genus.

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### 24. *Description of a new cherry tree from the Oregon Mountains.*

I noticed as early as 1829, in Washington Square of Philadelphia, a fine tree said to have been brought by Lewis and Clarke from the Oregon or Rocky Mountains. I ascertained that it was a n. sp. and sent an account of it to Decandolle in 1830. I call it *Prunus (Cerasus) rotundifolia.* Arborescent, leaves rounded, base often subcordate, end obtusely acuminate, margin serrulate. Flowers fasciculate, berries oblong small and black.

*Descript.* A fine large tree 20 feet high in 20 years growth. Bark very dark nearly black. Branchlets slender with a greyish brown bark, buds small rufous, with obtuse scales. Leaves like those of apricot, but much smaller, about one inch long, not so smooth, a little rough, but not pubescent. Blossoms in May and produces a profusion of white flowers with a fine smell of honey. The cherries are ripe in July, small, one fourth of an inch long, elliptical, looking like small wild plumbs; but black, soft and sweet when ripe. Good to eat, but if too many are eaten causing sickness in the stomach, like all the wild cherries. Stone oblong acute as in plumb, but without the 3 keels as in cherry.

I think that I have seen the same tree in West Kentucky in hills; but I did not see the fruit there. It may be found from Kentucky to Oregon. It is now naturalized in Pennsylvania, and may probably be improved by grafting. Birds and children are fond of the fruit. C. S. R.

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### 25. *Account of 2 N. Sp. of Dionea or Venus fly trap.*

This beautful genus was supposed to consist of a single sp.; but out of many plants brought from Carolina and Florida to our Philadelphia gardeners, I have detected 2 new ones *D. sessiliflora* and *D. uniflora.*

These are their respective characters.

1. *Dionea muscipula* L. Petioles cuneate broadly obcordate at the end; flowers corymbose, 4 to 9 on long peduncles, bracts linear.

2. *Dionea sessiliflora, Raf.* 1830. Petioles winged, oblong or subcuneate narrow, acute at both ends; flowers sessile, 3 to 5 aggregate, bracts lanceolate. Observed in the Botanical Garden of Macarran in blossom in May 1830. The true leaves are bilobe and ciliate as in the first, they also catch flies. Scape terete elongate, flowers white with short concave bracts. Divisions of the calyx lanceolate acute, Capsules

hardly longer oval acute. As pretty as the old sp. and will be a fine addition to our gardens. Brought from Carolina or Florida.

3. *Dionea uniflora, Raf.* 1830. Petioles oblong acute winged, Scape unifiore, bracts linear. Also from the same garden and place, perhaps a variety of the last; but smaller, leaves shorter and broader.

C. S. RAFINESQUE.

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## FRANKLIN TREE.
## *FRANKLINIA ALATAMA.*

26. *New Plants from Bartram's Botanic Garden.*

BY C. S. RAFINESQUE.

The Botanic Garden of Bartram, at Kinsessing on the Schuylkill, 2 miles from Philadelphia, is the oldest establishment of the kind in N. America, begun over 100 years ago by the elder Bartram. It is yet in a very flourishing state under the management of Col. Carr and his son; very rich in rare Southern plants and shrubs. There have been naturalized in Pennsylvania, the Franklin tree, Gordon tree, Stewart tree, Bigleaf Magnolio, and several other Southern trees. In my Medical Flora several new plants were described from this garden. I now propose to give periodically the description of many others, which the liberal owner has allowed me to examine, describe, preserve and draw.

I may give their figures hereafter; meantime I give above that of the beautiful Franklin tree, which grows with the utmost perfection in this garden. The original tree brought by Bartram nearly 60 years ago is now nearly 40 feet high. All those in other gardens come from this tree. Their sweet white blossoms and orange-like leaves make them highly ornamental and prized.

1. *Veronica precox*, Raf. Stem diffuse compressed probescent. Lower leaves opposite, upper alternate, on short petioles, ovate-rounded, serrate-laciniate, trinerve. Peduncles axillary solitary longer than leaves, capsules compressed emarginate. Annual Vernal in March and April, lasting only a few months, Grown in the garden from seeds received from a place unknown; but has spread all over the garden like a weed, and even is become spontaneous on the banks of the Schuylkill. A pretty small vernal plant, with delicate large bluish blossoms.

2. *Veronica Sparsiflora*, Raf. 1830. Stem erect, simple round solid, leaves opposite sessile cuneate, oblong entire obtuse. Raceme terminal lax very long. flowers scattered, bracts linear oblong obtuse, pedicels filiform. Capsules bilobed subcompressed. Annual native of Arkanzas or Texas, received from Prof. Nuttall. Stem 1 or 2 feet high. Flowers vernal purpurescent, handsome. Corolle rotate, segments of the calix unequal oblong obtuse. A pretty ornamental sp.

3. *Cotyledon marginatum*, Raf. Leaves crowded patent sessile spatulate; oblong acute thick, convex beneath, flat above, margin acute brown. Scape terete with 2 or 3 small

leaves ovate acute. Flowers in paniculate spikes naked. Corolla campanulate, 5 fid 5 gone. Fine perennial green house plant received from Mexico. Blossoms in summer, corolla acute, saffron color. Scape nearly 2 ft. high, calix 5 parted acute.

4. *Maranta obliqua*, Raf. Petioles terete scabrous, leaves broad lanceolate, base oblique, end acuminate, lucid above, glaucous beneath, very smooth. Perennial from Florida or Brazil.

5. *Iris aurea*, Raf. Stem straight biflore, leaves longer broad ensiform, end acuminate falcate, flowers geminate beardless, 3 petals obovate entire, 3 lanceolate undulate, stigmas dilatated notched. Discovered by Mr. Carr in a pond of the Pocono Mt. in the Alleghanies of Pennsylv. Very near to *Iris pseudacorus* of Europe, which however has bifid toothed stigmas, &c. Large Iris 3 to 4 feet high, with scentless flowers of a bright golden yellow, smaller than in I. *pseudacorus*. The 3 inner petals shorter than stigmas, equal to Anthers, casules oblong deeply sulcate.

(To be continued.)

## ARCHEOLOGY.

27. *Some Antiquities of Tennessee.*

By M. Rhea.

The following description of two ancient towns of the former inhabitants of Tennessee, was given us for publication by Mr. M. Rhea, the author of the late excellent map of Tennessee, with a geological section confirming our geological survey of Kentucky, and noticing a stratum of Oolite near the top of the Cumberland Mountains in Tennessee.

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On the plantation of A. Long, Esq. 3¼ miles South of Columbia, in Marny co. Tennessee, are seen the remains of an ancient town or village, containing six or more acres. The form is elliptical, extending East and West. Surrounded on the South East and West by a wall of clay which terminates at each extremity in the neighbourhood of four springs of water, which rise from the foot of steep cliffs on the North side of the Village.

The interior particularly at the Eastern end contains the ruins of many houses of various sizes from 10 to 30 feet diameter, all of circular form. Throughout the whole Village graves are found in abundance, from one to three feet in depth, and containing human bones of all common sizes. The bodies seem generally to have been buried in a sitting posture, with flat stones placed around and over them. Cups and small ornaments composed of earth and shells are found with the bones. Several small hatchets of very hard stone, and of various shapes have also been found. Other small polished stones, weighing from half a pound to 2 pounds, designed from appearances for breaking nuts, are frequent.

No metal of any kind whatever has been found in or about this Village, although much search has been made.

Several of the forest trees growing on the spot, which were removed by the proprietor within the last few years, numbered upwards of two hundred annual formations. Some of these trees were found growing on banks formed by the uprooting of other trees of equal size and age. From which may be inferred that many centuries must have elapsed, since the population of the place ceased to exist.

Opposite the mouth of Big rock house creek on Buffaloe river in Perry county, Tennessee, are the remains of another large ancient Village, similar in general appearances to the one described. Near the Western side is a large mound, of an exact four sided rectangular figure, the lines of the sides pointing nearly to points of the heavens. The elevation is extremely regular, the height about ten feet, with a flat surface, and steep, almost perpendi-

cular sides. The exterior has not yet been penetrated.

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28. Some Antiquities of Ohio.

Notwithstanding the long account of the monuments and ancient towns of Ohio by Atwater, in the Archeologia Americana, and my own synoptical account of the ancient monuments of North America; there are many more as yet unnoticed, of which I shall now describe two.

1. Near Alexandersville, 7 miles S. of Dayton in the Valley of the Great Miami river, the main road from Cincinnati to Dayton, which I travelled in 1826, crosses the site of an ancient town, of about 500 acres extent. It forms a perfect ellipsis, nearly one mile long, from N. to S. It is surrounded by a wall or embankment 25 feet broad and 8 feet high, without any ditch outside nor inside. It has 3 gateways to the East, West and North, this last is close to the River Miami, which has partly washed away the embankment. By its size and shape it could not have been a temple; but rather a town. I could see no mounds nor altars near it. It is very old, the walls being rounded, covered with soil and large trees.

2. At the mouth of Grand River on Lake Erie, where now stands the town of Fairport, stood about 50 years ago, an old Indian fort, exactly of a pentagone shape, with unequal sides, inclosing several acres. The wall was of rough stones, partly cemented, but covered with soil, and trees 300 old were growing on it. This account was given me by an old settler and is rather obscure. The stone wall, with a kind of cement is rather singular and doubtful. This may have been one of the forts of the Erigas or Erie's Nation, built for defence against the Senecas, who drove them off South of Ohio in 1650; but it was far more ancient; the trees showing that it had been left, soil formed and trees begun to grow towards 1475.

C. S. R.

29. Economy or Science of Wealth

The Divitial art is a new branch of this science, which teaches how to produce and increase wealth, by carefully husbanding and employing the Savings of Industry: whereby industry itself, with moral happiness, and social comforts are also promoted.

Among the many institutions to which this art has given rise, the Beneficial Societies and the Savings' Banks are the most conspicuous and useful; but some others less known are not less so, and there is room for several new ones on improved plans.

Having paid peculiar attention to this subject, written an analysis of this art, and found some new important principles of it: we propose to invite the public attention to it very speedily in a more impressive form; when we have visited the new institutions lately established in Baltimore; where these principles were first made known by us in 1825.

Meantime we merely state now, that the two fundamental principles which we claim to have discovered and published in 1825, are,

1. That every dollar and cent saved by industry, frugality and care, ought to be invested with the property of accumulating at simple or compound interest, *by conversion into Stocks!*

2. That every public or private Stock consisting of such Savings, ought to be divisible at pleasure into any required amount of dollars and cents. Whereby any Savings become convertible into productive Stocks, and any such Stocks convertible into fractions available as money or remittances.

It is evident that such ample and useful principles cannot fail to interest every body that can save a penny out of industrious earnings: nor fail to be applied every where, when more generally understood, as they have already partly been applied in Baltimore and Boston.

C. S. R.

## 30. ATLANTIC REVIEW.

Until this Journal assumes the Monthly form, it will be impossible to give comprehensive Reviews, and we must confine this department to short ecclectic notices. We are even inclined to curtail them; since we might sometimes offend irritable authors, who do not wish that the defects of their works should be exposed. But a veridic, enlightened and independent Review is very much needed, and we hope to be enabled to furnish one hereafter.

1. Cabinet of Natural History and American Rural Sports. Philad. 1831. 1v. 4to. with 24 colored figures of animals. Published by Mr. Doughty. A popular work issued in monthly numbers, with good figures and interesting accounts of quadrupeds, birds, &c.; but some bad names. The authors being chiefly anonymous, their wonderful tales and lucubrations can be of no authority in science.

2. The Alphabet of the Primitive language of Spain, and Philosophy of the Euscaran or Bask people. Extract from the work of Mr. De Erro, by G. W. Ewing. Boston, 1829, 1 thin 8vo. with the Bask alphabet. Very valuable philological work, proving the antiquity of the Euscaran language and alphabet, akin to the Etruscan and Greek; and giving the primitive philosophy of numbers. We shall again notice this work.

3. Manual of the Land Birds of the U. States and Canada, by Prof. Th. Nuttall, Boston 1832, thick 12mo. with many wood engravings. Very good compilation, useful like all manuals, with some original observations, and tolerable figures; but those of birds should be colored.

4. On the Causes, Cure, and Means of Preventing the Sick Head-ache, By Dr. James Mease, Philada. 1831, small 8vo. A useful small work, teaching what diet and changes of habits will cure this disease.

5. Geography and History of the Western States, By T. Flint, Cincinnatti, 1828. 2 vol. 8vo. A lively popular writer, but neither profound nor always accurate.

6. Sketch of Long Island, By Silas Wood, Brooklyn 1824, 1 vol. 8vo. Much addition to historical knowledge, and on the Indians of Long Island with a vocabulary.

7. Annals of Philadelphia and New-York, By Walton. Philada. 1830, thick 8vo. fig. Curious book on the first state of these cities and their gradual changes.

8. Collections of the Historical Society of Maine. Portland 1831. 8vo. Some addition to historical knowledge. The most interesting articles are a compendious history of Portland, with a map, by Willis, and an Essay on the Noridgwock or Penobscot language, a dialect of the Abenaquis, by Lincoln.

## 31. SCIENTIFIC NEWS.

1. Newman, a German traveller, has lately brought 10,000 Chinese manuscripts from China to Germany. What a treasure of new learning for Chinese scholars!

2. Mr. N. Dunn of Philadelphia, has brought home from China where he resided 11 years, a very extensive collection of implements, models of arts, dresses, natural objects, &c. He means to begin a Chinese Museum in Philadelphia, and make it a free Institution. A laudable example worthy of imitation.

3. In Austria, ruled by one of the most despotic governments, there are schools in every Village paid by the State, every child is compelled to learn reading, writing and numeration. By a late law no one can be married, nor received as a servant if he has not learnt this. Many of our States appear to be behind Austria in civilization and education, since they neither pay for it nor encourage it. No uneducated man ought to be a voter in this enlightened age and country.

4. Mr. Tanner is preparing a new edition of his large map of the United States, much improved, and above all, with many corrections and additions in physical geography and oreology. He has very liberally purchased the surveys of Hills and Mountains made by Prof. Rafinesque in many States, and the Northern or N. E. termination of the Alleghany will no longer be lacking in our maps. All the range of hills in Ohio and Kentucky will be added for the first time to our geography.

5. T. A. Conrad has issued 3 numbers of his Marine Atlantic Conchology, containing the genera Pecten, Lima, Solen, Solecurtus, Nucula, Sanguinolaria, Petricola, and Cardita, with colored figures of each sp. He is also engaged on a work on our fossil shells, which is speedily to be produced or begun.

*T. Town, Printer, Back of* 112 *Walnut St.*